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Building Up a High-producing Herd.

Need for Proper Provision for the Feeding of Calves.

J. E. Bell, Instructor in Agriculture, Auckland.

THE dairy calf is usually the most abused baby animal on the farm. The piglet, the foal, and the lamb is each allowed to suckle its mother until such time as it can forage for itself, but the dairy calf, at the most, is allowed access to its natural food in the natural way for only two or three days, and is frequently taken away from its mother at birth.

Calves are raised, for the most part, on foods inferior in feeding-value to whole milk, and consequently the rearing of them is attended with much greater difficulties than is the rearing of other young live-stock on the farm. Milk from the mammary glands of the sow, ewe, mare, or cow is clean, wholesome, and of the right temperature. Often, the calf has to put up with cold food fed from a dirty utensil.

The future performance of the calf as a cow will depend to a very great extent on its treatment as a calf. No animal can stand the strain of producing large quantities of milk year after year unless it is of sound constitution, and the constitution of the cow will not be sound unless as a calf it is fed regularly with the right kinds and quantities of food, with attention paid to such important things as shelter and cleanliness.

Proper provision for the feeding of calves is essential if a herd of high-producing cows is to be built up and maintained. Calves do not thrive if fed collectively, and it is contended that suitable but inexpensive feeding-bails will not only simplify feeding, but will also ensure that each calf receives its allotted quantity of milk and supplement. Descriptions of efficient calf-feeding bails and lay-outs from different districts are published to give farmers a wide variety of ideas.

Preparation of Quarters.

The preparation of the calf's quarters should be carried out before the birth of the calf. The stall should be well ventilated, with free passage for air above, yet with no cracks in the walls at or near the ground-level which will let in draughts. The stall should be in a warm position but with provision for shade, so that the calf is not forced to be in the direct heat of the sun for long periods in the middle of the day. A corner in a shed can be utilized by placing boxes round a space to form a pen.

All holes giving rise to draughts should be blocked, and the place should be cleaned free of dirt and then disinfected. The floor should be covered with hay or straw to make a comfortable bed for the newcomer. A cover made of sacking or, better still, made from an old blanket should be used to keep the calf warm and protect it from flies.

It is still an altogether too common sight to see calves in dull, dreary, and dirty quarters shivering because they are cold. They will not do well under such conditions; their chances of becoming diseased are increased, and their bodily resistance to germs is thereby lowered.

Housing Provisions.

Few farmers make special provision for their calves. Figure 1 shows a special shed for calves on Pearson Bros.' farm at Patumahoe. It faces the sun, and is backed by a good thick hedge. There is a run-out at the far end on to clean pasture. The whole of the front of the shed can be opened to let in the sun's rays or be closed to keep out chilly winds.

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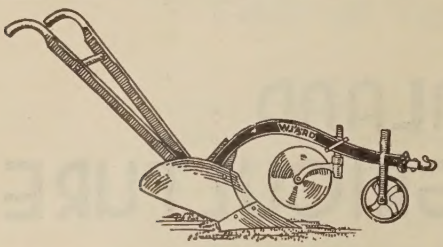

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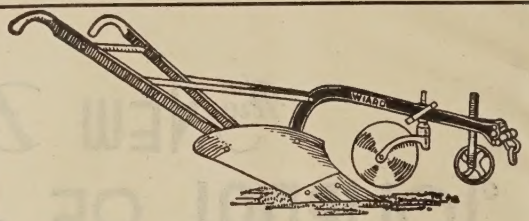

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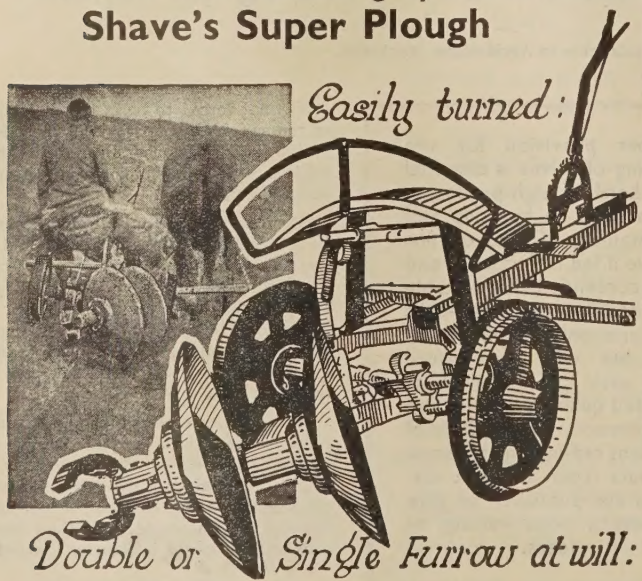

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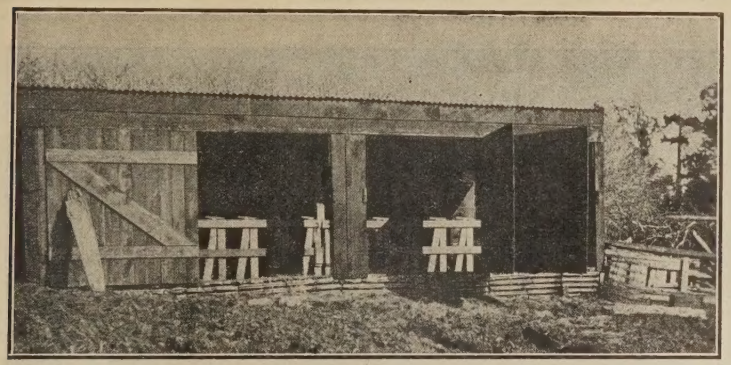

Fig. 1.—A special shed for calves.

Figure 2 is a close-up of the bails, showing the simple method by which the calf is held for drinking. At the back of the shed there is a rack for hay, and it is surprising how much hay a calf will eat.

Figure 3 shows the interior of the shed taken from the exit for the calves to run on to pasture. The entrance in the illustration at the far end is for the farmer, and there is a lane between the bails and the front of the shed for him to move up and down as he attends to feeding the calves. Thus, all feeding can be done out of the weather. The floor is covered with dry hay to form a cosy bed for the calves.

Figure 3 also shows the rack for the hay. In a shed such as this, feeding takes only a few minutes, and is not accompanied by the banging of empty buckets on the heads of the more virile or greedy calves and the spilling of milk. Figure 4 shows this year's calves basking in the sunshine in their sheltered, dry paddock which leads out from the calf-shed, which is placed close to the cow-shed to save long cartage of the milk.

Attention at Birth.

A clean bucket (half a new kerosene-tin with the sharp edges turned down and a piece of wood nailed along one side does excellently) should be made available for feeding. A little carbolic acid as an antiseptic, and half a sack of quicklime should be ready for use when required.

Attend to the navel as soon as the calf is born. It is through the recently ruptured navel that disease germs often enter. The navel should be cut to 3 in. to 4 in. from the body and tied with disinfected string if necessary. Wash the navel with carbolic acid about one part to forty parts of water. The calf may be left with the mother for a few days or taken away immediately after birth and placed in its stall. It is assumed here that the calf is taken away immediately after birth.

At this stage it may be mentioned that the fourth stomach (abomasum, or reed) of the calf is fully developed at the time of birth, while the other three stomachs—rumen, or paunch; reticulum, or honeycomb; omasum, or manyplies—which are not fully developed at birth, are small and do not take in the digestion of food until the calf is old enough to eat solid food. The fourth stomach is the one in which rennet is secreted, and is known as the "vell." As the calf learns to eat

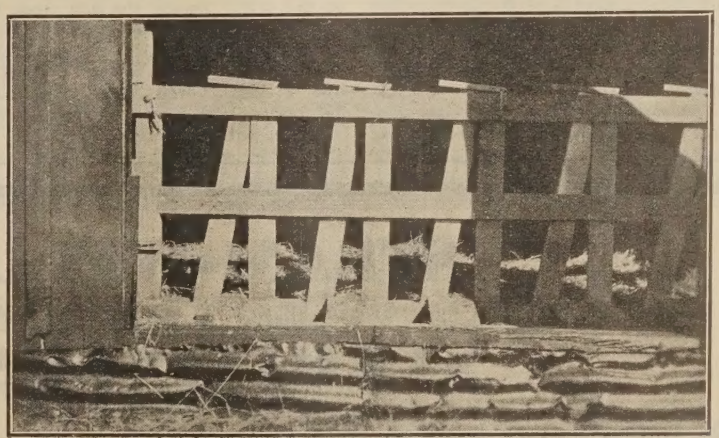

Fig. 2.—A close-up of the bails, showing the simple method by which the calf is held for drinking.

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solid food the other stomachs gradually develop and the digestion process becomes similar to that of grown animals.

Care in Feeding.

The first milk after calving, which is known as colostrum or beestings, is thick and sticky because of the large amounts of building-up solids it contains. For this reason, and also because it acts as a medicine stimulating the digestive organs, every calf should be fed on colostrum for the first few days unless it is exceedingly blood-stained. During the first week following birth the composition of the milk gradually changes to normal, but for the first six days it must not be used for either human consumption or supplying a factory. There is therefore no loss in giving the calf its mother's milk for the first week at least.

Whole milk is the natural food for calves, as it contains in the right proportions all those substances that are necessary for the growth of the body. The fat and sugar are heating substances, the casein and albumen are building-up substances, and the ash is necessary for bone-formation.

The care taken in the first month is most important, as any defects in feeding at this time materially affect the growth of the calf. During the first week the calf should be given 3 quarts to 5 quarts of its *mother's milk*, preferably immediately after milking or warmed to 100° F. and *not over*. The buckets must be washed after feeding, first with cold, and then with scalding water.

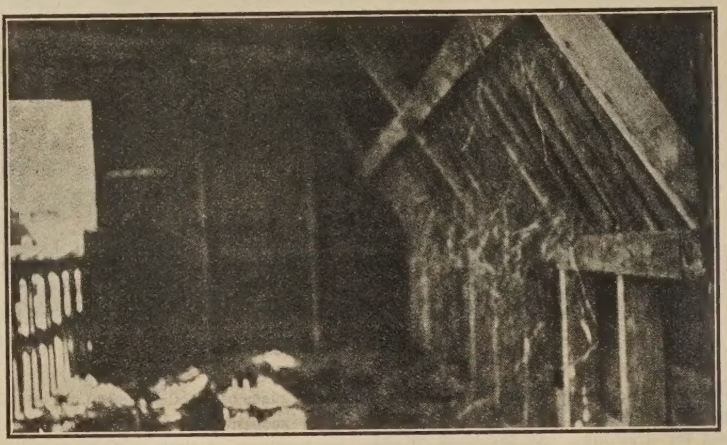

Fig. 3.—The interior of the shed. The entrance at the far end is for the farmer, and there is a lane for ease in feeding the calves.

Second Week's Feeding.

During the second week the calf may be fed with 5 quarts or 6 quarts daily of clean, preferably freshly drawn, milk, or milk warmed to 100° F., in three feeds. From this time onwards give the calf a level teaspoonful thrice weekly of baking-soda in the milk to prevent scours. Scouring in calves is a very common ailment, and the following are the contributing causes :—

(1) Too long a time between feedings.
(2) Overfeeding.
(3) Dirty buckets or pens.
(4) Hot weather.

Immediately a calf shows signs of scouring, give, according to its age, 1 oz. or 2 oz. of castor-oil in the milk. Reduce the ration by half the amount, giving it a whole-milk diet with a tablespoonful of limewater every meal. Clean the pens out thoroughly and disinfect them. If a calf is dull, give it a cup of beer. If the scour is exceptionally evil-smelling, add four drops of formalin per quart of milk given. It will be found, however, that if the management is at all reasonable calves treated regularly with baking-soda rarely develop scours.

The Third Week.

During the third week a start must be made with the substitution of separated milk or skim-milk for the whole. This must be done gradually so that by the end of the third week the calf is receiving 3 quarts of whole and 4 quarts of skim-milk per day, warm, and in three meals. To substitute the fat that is lacking in the skim-milk the calf should be gradually introduced to linseed porridge or crushed oats, until at the end of the fourth week it is getting ¾ lb. of crushed oats or one good handful of linseed porridge every day.

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The calf can be induced to take the crushed oats by placing them in the bottom of the feeding-bucket after the calf has drunk the milk. The linseed porridge is best mixed with the milk. It is important to keep the young calf's bowels in order, and it is well to remember that cereals and skim-milk are binding, and that linseed-meal has a laxative effect.

Linseed Porridge.

The separated milk must be fed warm and fresh after separation, care being taken to allow the air to escape from the milk by allowing it to stand a short time and drawing the milk from the bottom of the can. Linseed porridge is made by stirring linseed meal with boiling water and adding half a cup of flour per quart of meal per gallon of boiling water. Then boil the mixture for twenty minutes, and allow it to cool by leaving it on the fire until the fire is dead and the porridge is cool.

During the fourth week the whole milk can be gradually reduced, until at the end of the week the calf is receiving 8 quarts of skim-milk, plus 1½ lb. of crushed oats or two handfuls of linseed porridge daily in three feeds, fed warm.

From the second month onwards the calves receive 9 quarts of skim-milk and 1½ lb. of crushed oats or two handfuls of linseed porridge in two meals daily. A little good hay and rock salt should be available. In the daytime the calves should be kept in grass paddocks, running ahead of the dairy herd. Good, clean water should always be available, and is required to keep the calf healthy.

Fig. 4.—This year's calves basking in the sun in their sheltered, dry paddock.

Dehorning and Weaning.

Dehorning should be done when the calf is but a few days old. Clip the hair away all around the horn bud, and apply vaseline around the horn. Moisten the hair on top of the horn, and then apply the caustic-potash stick. Be careful with this, and wrap the stick in paper, as it will burn the hands. Dehorning in this manner is much more humane than the sawing or clipping off of the horns when they have grown.

Weaning, which may be carried out between four to six months, should be carried out in stages in order that the calf may accustom itself gradually to grass feeding. When weaned, the calves should be put on a clean grass paddock, and, if the summer is dry, given green feed or ensilage. Before the autumn grass growth has stopped, the calves should receive hay and be wintered in a sheltered, dry position.

Calf-feeding Bails.

E. H. Arnold, Instructor in Agriculture, Dargaville.

In systematically building up and maintaining a herd of high-producing cows it is important that proper provision be made for the feeding of the calves. It is improvident to obtain a promising heifer from a first-class cow by a butterfat-backed bull and to let it become stunted or die at an early age for want of attention and proper feeding.

Calves do not thrive if fed collectively; the stronger calves obtain more than their share of the feed, while younger calves receive insufficient nourishment. It appears unnecessary to state that feeding calves from buckets in a paddock or through the wires of a fence is just as unsatisfactory. The provision of suitable feeding-bails not only simplifies the work of feeding, but ensures that each calf receives its allotted quantity of milk and supplement.

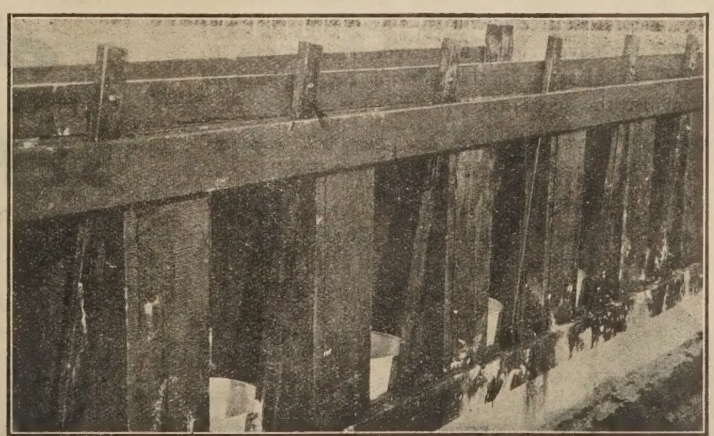

Fig. 1.—A view of the calf-feeding bails at the Northern Wairoa Experimental and Demonstration Farm, Dargaville, showing the bails open ready for the calves to be allowed in for feeding.

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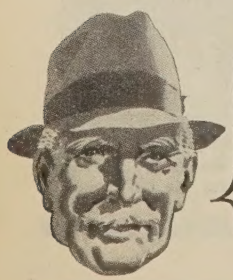

Farmer: "Well, I'm satisfied. The LISTER will do me."

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Simple Construction.

Feeding-bails need be nothing elaborate, and bails similar to those recently erected at the Northern Wairoa Experimental and Demonstration Farm, Dargaville, can be readily built by any farmer. The accompanying photographs and diagrams give sufficient information to enable similar bails to be erected.

The layout on the farm enables eight calves to be bailed up and fed at one time, but whether sufficient bails are erected to feed all calves at the same time or in batches of, say, six or more depends upon the circumstances on the particular farm. The feeding-bails should be placed on a well-drained site convenient to, but not immediately adjacent to, the milking-shed.

Concrete floors are essential; and at the Demonstration Farm an area 5 ft. wide was laid on the calf side and a passage 3 ft. 6 in. wide was provided on the feeding side. No roof has been provided over the bails. This is not essential, but it would give more comfort to the calves and make the work of feeding more congenial during wet weather. The design as illustrated allows for the eight calves to be bailed up at one time, but if necessary, by removal of the holding-bolt, a calf can be held while the others are let out.

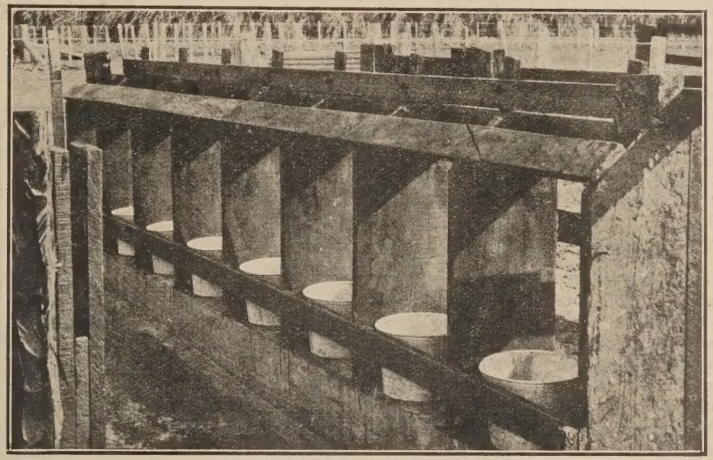


Fig. 2.—A reverse view of the feeding-bails, showing the feeding-buckets in position and the method of holding them in place.

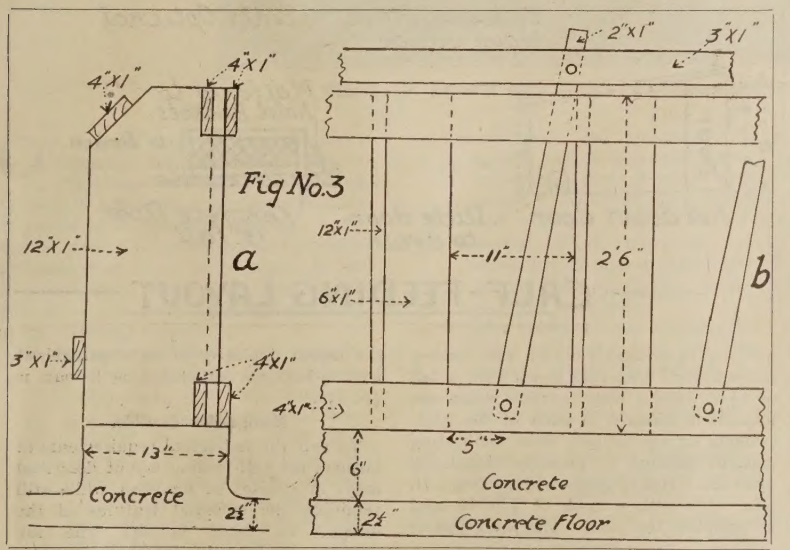


Fig. 3.—(a) A cross-section of feeding-bails. (b) A front view of feeding-bails, giving details of construction.

Feeding the Calves.

In feeding the calves at the farm sufficient milk is taken to the bails for the feeding of eight calves. After being fed the calves are held in the bails while another lot of milk is brought over for the next batch. By being held in the bails for this time after they have consumed their ration of milk the calves are prevented by the 12 in. by 1 in. partitions from acquiring the bad habit of sucking one another. It is found that when they are let out afterwards they do not attempt this common habit.

Layout for Calf-feeding.

C. R. TAYLOR, Fields Instructor, Whakatane.

TO facilitate the proper feeding and general care of calves during what is probably the most critical period of their lives the Maori farmers associated with the Ruatoki Native Land Development Scheme, Whakatane County, are gradually being provided with calf-feeding layouts which, while quite inexpensive to construct, are highly efficient in operation. The layout has been designed by the Assistant Supervisor, Mr. J. Merritt, in collaboration with the Supervisor, Mr. L. Brown, to whom the thanks of the writer are due for their courtesy in making available much of the information for the benefit of the readers of the *Journal*.

Individual Treatment.

The layout described is attached to the property of a Maori farmer milking between thirty-five and forty cows, the majority of the heifer calves from which are retained for future herd replacements. For feeding, the calves are brought in from an adjoining paddock and held in the drafting-pen until it is convenient to proceed with the actual feeding. Eight calves are then run off into the feeding-pen, where there is a separate place and bucket of milk provided for each calf.

When fed, they are transferred to the holding-pen or, if desired, allowed to pass through it back into the paddock again. This operation is repeated until all the calves have received their correct ration of food. If it is necessary to hold back a calf for any reason for special attention, this can be accomplished quite simply. Thus, 100 per cent. individual treatment is possible—a feature which will commend itself to farmers as being very essential at times.

Feeding the Young Calves.

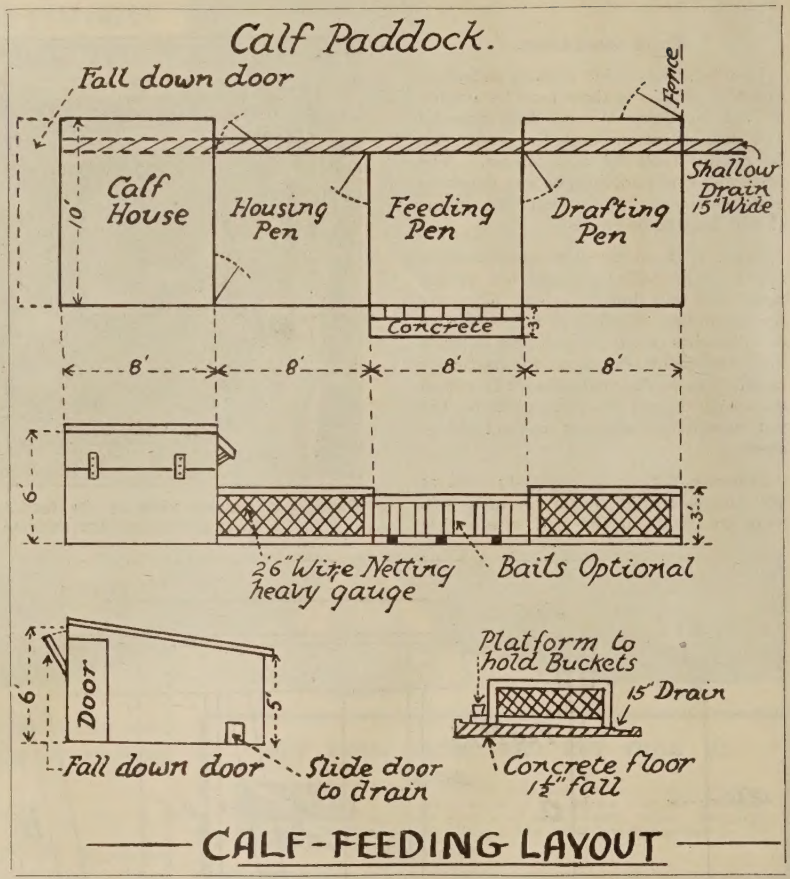
Young calves up to a week old are usually accommodated in the calf-house and bedded down on plenty of good hay spread out on the concrete floor. Adequate drainage is provided, as indicated in the sketch plan, and ample provision for air and sunshine is allowed by the construction of a fall-down door facing the north.

The feeding of the young calves is generally undertaken before assembling the older ones in the drafting-pen, but the rotation adopted is really immaterial as long as a general mix-up is avoided. Receptacles for storing small quantities of meal and other accessories are suitably arranged within the shed out of the reach of calves, and are therefore always close at hand whenever required.

Construction of Bails.

The timber used throughout construction is all rough O.B. rimu, suitably painted to preserve it from the undesirable effects of climatic conditions. Weatherboarding for the shed is 9 in. by $\frac{3}{4}$ in., and the plates, studs, and rafters, &c., are all 3 in. by 2 in. Railings for the pens, which are 3 in. by $1\frac{1}{2}$ in., are securely fastened at all corners to ordinary, well-squared totara fencing-posts, which were placed in position before the floor was concreted.

Gate timber is all 3 in. by 1 in., and such items as feeding-division uprights and the bucket-platform are constructed from 3 in. by $1\frac{1}{2}$ in. and 3 in. by 2 in. timber respectively. Concrete floors with a fall of $1\frac{1}{2}$ in. into a wide, shallow drain are important features of each of the components of the layout, thus facilitating efficient flushing to preserve cleanliness after use. Heavy-gauge wire-netting 2 ft. 6 in. wide with a mesh of 3 in. is used to complete the pens. The total cost of the layout, inclusive of eight galvanized feeding-buckets but excluding labour, is £12 17s.



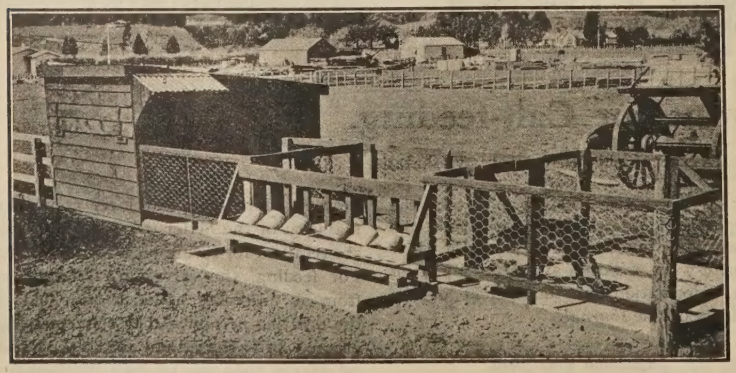


Fig. 2.—The calf-feeding lay-out in operation.

Modification Possible.

To suit the individual requirements of farmers the calf-feeding layout described may, of course, be modified while still retaining the essential features of the design. To those farmers who are anxious to provide the best possible treatment for their calves, realizing that any young life can be made or marred by the attention it gets in the early days of its existence, the above can be thoroughly recommended.

In these days of high average dairy herd appreciation—up to 20 per cent. in some instances, and, not infrequently, more—the surest, safest, and undoubtedly, in the ultimate, the cheapest method of providing the animal replacements necessary in the average herd is to raise one's own young stock. To do this effectively, however, admittedly involves a little extra labour and, at times, the exercise of no little amount of patience, but "the reward is great, even if the way is a little thorny."

❖ ❖ ❖

Stumping with Tractor-power.

Reduction in Cost per Acre.

A. J. Galpin, Fields Instructor, Palmerston North.

Fig. 1.—A general view of the stumping in progress.

On a large proportion of the more recently drained swamp areas in the Manawatu district, estimated at some 50,000 acres, the initial difficulty of providing satisfactory drainage facilities has proved to be only one of the major problems that must be overcome in the development of this land. These major difficulties can be summed up generally in the following sequence :—

(1) *Drainage.*—A note must here be added regarding the relatively high costs which this first step involves. Special drainage rates as high as £1 per acre are being carried by the Manawatu district; in other words, capitalized at 5 per cent. this represents an added charge of £20 an acre to be borne by the land.

(2) *Consolidation and Grassing.*—The surface soil is generally peaty, but with no great depth of peat, which is underlain by a fertile silt.

(3) *Stumping.*—Many areas on consolidation disclose a dense stand of tree stumps, mainly yellow-pine and white-pine.

(4) *Fescue Invasion.*—As drainage became improved and the land became cleared of flax, &c., for grassing, tall fescue came in, and even after ploughing it reinvaded the pastures.

(5) *Fencing and Building Difficulties.*—Lack of consolidation of the soil brings further difficulty.

(6) *Stock Losses.*—Fescue-poisoning is one of the main stock troubles.

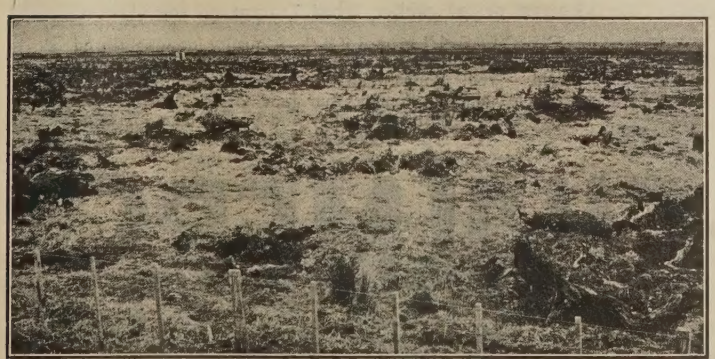


Fig. 2.—A general view of the type of country discussed in this article.

The initial difficulty of drainage has now been overcome, but it has left the land to bear an added burden of relatively high rates, and it seems that any ideas and practices that are proving economical in dealing with some of the subsequent difficulties should be given publicity. It is with this in view that short articles on the subject will be prepared to bring to the notice of farmers in similar circumstances ideas and methods which appear to be offering economical possibilities in overcoming these very practical difficulties which, if not tackled correctly, can prove highly costly and often heart-breaking operations.

Cost of Stumping by Hand.

It is well to consider first some practical examples of the costs that have been incurred. In tackling the job of stumping by hand and the use of explosives, examples of areas costing as high as £25 an acre can be quoted, while £10 to £15 is considered an average charge. When it is remembered that the carrying-capacity of this land in its present state is about one milking-cow to 2 acres and that the original figure at which this country was purchased without buildings varied from £20 to £45 an acre, it can be realized that the capitalized costs involved in recognized methods of stumping are placing a cost on the land higher than its production value.

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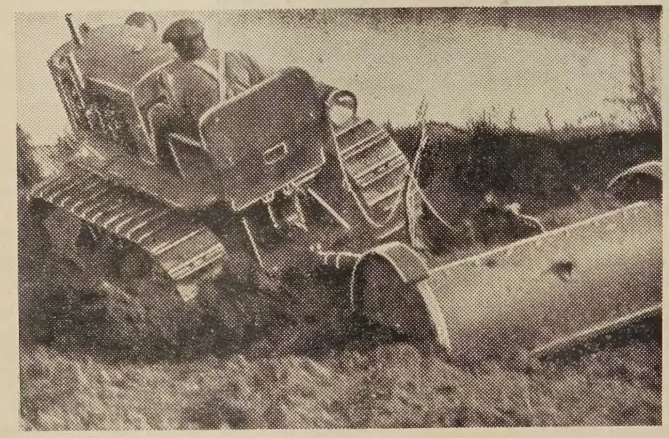

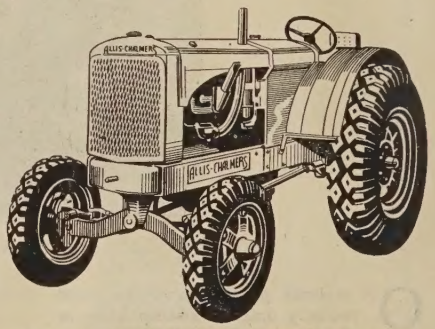

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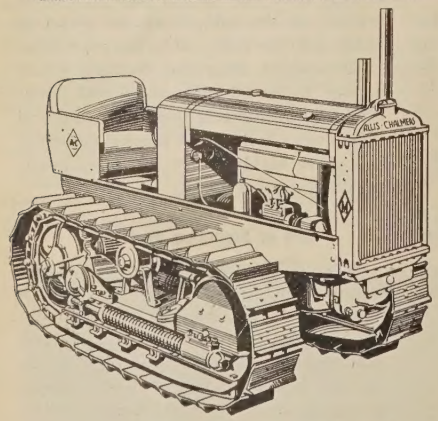

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The Tractor in Stumping.

The use of a suitable tractor and gear for stumping can effect a very considerable reduction in the cost per acre on land such as that illustrated in Fig. 2, which is typical of a considerable area of the swamp country being developed. The following details of contract work in stumping a typical area illustrate this fact.

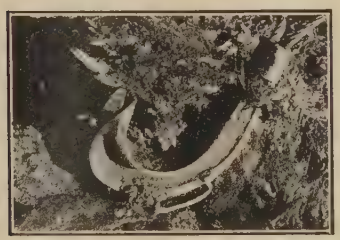

Fig. 3.—A close-up view of the hook which grips the stumps.

The tractor has a Diesel engine which is capable, providing the ground surface is fairly firm, of registering 36 d.b. h.p. The connection between the hock and tractor is a double-length 1 in. steel cable approximately 12 ft. in length.

Operating the Tractor.

The hook shown in Fig. 3 is used to grip the stumps. This hook weighs 75 lb., and its grip on the stump is made by its pronged point being forced into the stump, making a grip which, providing the stump is fairly sound, will withstand a strain of more than 8,000 lb. d.b. pull.

Fig. 4.—The stump actually coming out of the ground. It is a yellow-pine stump weighing approximately 1½ tons.

To enable the tractor to keep working to capacity a team of three men is required, one man's time being fully occupied in placing the hook in position for each pull. The other two, while occasionally assisting with the hook, clear the stumps sufficiently to allow a grip to be obtained by the hook, but providing a relatively small amount of timber is showing—just sufficient to allow the hook to make a firm grip—no ground clearing is necessary.

Costs and Details.

To illustrate the costs involved in this method in comparison with the costs involved in the methods mentioned earlier in the article—namely, from £10 to £25 an acre—the actual costs incurred on an area of 5 acres are given :—

An area of 5 acres, stumped and cleared, occupied three men with a tractor and driver for nine hours (the old methods, using gelignite, was estimated to take one month with three men).

	£	s.	d.
Cost of tractor and driver (nine hours at 17s. 6d. per hour)	7	17	6
Cost of labour (three men for nine hours at 2s. per hour)	2	14	0
Total cost for 5 acres	10	11	6
	£	s.	d.
Cost per acre	2	2	4
Additional cost for logging up and clearing roots	1	10	0
Total cost per acre	3	12	4

Where odd, very deep, and massive stumps are encountered the explosive eruptite is used very effectively in loosening the stump prior to pulling. On the area in question no explosives were used.

Assistance is acknowledged from the following in the preparation of the material for this article : Messrs. Pratt (Kairanga), B. Chrystall (Lockwood), and D. Kernohan (Awapuni), and H. Drake for the illustrations.

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Blowfly Strike in Marlborough.

Incidence and Control Discussed.

W. V. Macfarlane, Zoologist, Department of Agriculture, Wallaceville.

DURING the spring, summer, and autumn of 1935–36 sheep in Marlborough suffered severely from all forms of blowfly attack. As a result, the Sheepowners' Union proposed that an investigation of the position be undertaken, as the intensity of strike appeared to be increasing. Accordingly, it was arranged that Dr. D. Miller, Director of the Entomological Division of the Department of Scientific and Industrial Research, should examine the maggots found infesting sheep, and that field observations should proceed concurrently in Marlborough.

A great deal of work has been done in Australia, Europe, America, and Africa on the causes of fly strike, but no general account of the New Zealand position has hitherto appeared. Only one province has been examined at present, but the conclusions apply to much of Central Otago and the hill country of Canterbury as well as Marlborough. The 1937–38 fly season was exceptionally mild in Marlborough, but it was estimated that £2,000 was lost in labour, wool, and sheep by the forty worst-affected sheepowners. In a bad season five times the loss might be expected, and many more stations would suffer.

Four Regions.

Marlborough may be classified into four regions of fly strike :—

(1) The east coast half-bred area—practically no trouble from the fly during the 1937–38 season.

(2) The crossbred and half-bred fattening areas around Ward, Seddon, and Blenheim—moderate crutch strike.

(3) The Wairau and Waihopai hill country carrying Merinos and half-breds — moderate crutch, back, and tail strike.

(4) The western hills and Sounds with cross-bred and half-bred sheep—slight crutch strike.

It was therefore in the Wairau and Waihopai river-basins and near Ward, Seddon, and Blenheim that 90 cer cent. of the strike occurred. During 1935 the half-bred (east coast) country suffered much more severely, and there is no apparent reason for its later freedom from strike.

Following the severe forms of blowfly attack in Marlborough in 1935–36, an investigation has been undertaken. There is no general panacea, and fly-control is bound up with farm economics. Control methods involve early and regular crutching of lambs, autumn jetting against back strike, surgical removal of crutch and tail wrinkles, careful tailing and crutching, and breeding away from susceptible forms of sheep.

Maggots found on sheep were bred out at the Cawthron Institute and in Blenheim, and were found to be nearly all those of *Calliphora laemica*, the brownish-yellow blowfly. About 5 per cent. of the Marlborough strikes contained specimens of the small green fly *Lucilia sericata*, which is nearly identical with the fly mainly responsible for strike in Australia. Females of the large green fly *Chrysomyia rufifacies*, which produces hairy maggots, and *Ophyra analis* (shining black fly with folded wings) were rarely found to have deposited eggs on sheep, both as primary and secondary flies. Succession of flies in a lesion is unusual in New Zealand—a further distinction from Australian conditions.

The causes of the female flies being attracted to oviposition on sheep are varied, and it is this fact that complicates control of the strike.

Crutch Strike.

Crutch strike was found to be the result of susceptibility produced by urine-staining, or occasionally by grass scour. For urine-staining to be an effective bait to the fly the skin as well as the wool should be wet, although wet wool with droppings on it may be sufficient. When the skin is wet it becomes irritated and finally breaks down, so that bacteria, decaying skin, serum, pus, and urine combine to encourage egg-laying.

Fig. 1 shows the crutch of a Southdown ewe, rising two-tooth, showing how urine-staining predisposes to strike. The skin of the under-surface of the tail and of the vulva where the tail rested was broken and scabs had formed. The labia of the vulva were thickened, and the orifice was irregular. The tip of the vulva had either sloughed off or had been cut off at crutching, and urine had dribbled down the crutch and spread laterally. The skin on the stained area was ulcerated and wet, accompanied by pus and detritus. The last few drops of urine at micturition were responsible.

Fig. 2 shows the vulva of a Merino ewe, rising two-tooth. There are no lateral wrinkles on the breech of this sheep, but the wool on the left side of the crutch is badly stained with urine. The left labium of the vulva is lower than the right (asymmetrical), and the tip of the vulva is twisted to the left.

The structures of ewes that tend to produce urine-staining are :—

(1) *Medial Crutch Wrinkles.* — The wrinkles (chiefly in Merinos, comebacks, and half-breds) collect sweat, suint, and urine. This occurred in 33 per cent. of cases examined.

(2) *Vulval Malformation* (Figs. 1 and 2).—In the ewe only an occasional drip of urine is necessary to lead to the formation of a suitable area for fly strike, so that a twisted or lacerated tip to the vulva, asymmetrical or thick lips, or scabs on the vulva may divert a little urine on to the crutch at the end of micturition (54 per cent.). Wrinkles and unsound vulvæ worked together in producing susceptibility in 13 per cent. of cases.

In Australia, where Merino flocks predominate, it is considered that almost all the strike results from wrinkles. In Marlborough, half-breds and crossbreds suffered 45 per cent. of the observed crutch strike. Neither the half-breds nor the almost equally numerous Merinos are very markedly wrinkled, so that the badly shaped vulvæ are relatively more important than in Australia.

Table I.—Distribution of Strikes among Thirty-four Flocks.

(10,720 Merino and 11,990 half-bred; there were 1,352 observed strikes.)

—	Urine Stain.	Back Strike.	Tail Strike.	Head Strike.	Grass Scour.	Dags.	Udder.	Foot-rot.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Merino and comeback ..	26·4	50·4	18·1	3·7	0·5	..	..	0·9
Half-bred, crossbred, and purebred English	68·3	13·9	1·6	..	6·1	7·7	1·8	1·6

Sheep on the high-country runs may not be shorn until January, so that strike on the dags sometimes takes place. Among lambs, strikes on a brown mucoid scour after digestive disturbance at shearing-time were observed. Similar slight attacks followed the flush of feed that appeared in February. But scourings rarely attract fly unless there is urine-staining as well. The intestinal worm-infested areas suffered strike before the worm scour commenced, and suffered very little while the scour was in evidence. The general condition of the sheep, also, has practically no part in encouraging crutch strike, and crutch strike was shown to have no definite relation to weather.

January and February were the months in which the greatest amount of crutch strike occurred, but that was very largely due to the times of crutching. Some strike took place during each month from November to June, no matter what the weather. After 15th June, however, temperatures are too low to permit the adult flies much activity, although the brown blowfly continues to be prevalent through the year and will lay eggs at any season. While the mean temperature of the month is below 45° F. strike is rare—*i.e.*, July and part of August.

Back Strike in Australia.

Relatively little back strike is encountered in Australia, but in this country it is the greater menace. Compared with crutch strike, its lesions are more extensive, its death-rate greater, and its control more difficult. In addition, it is not predictable, beyond the fact that it occurs in autumn. Strikes on wrinkled tails (Merino) and on rams' heads behind the horns are localized forms of back strike.

The reason for this laying of eggs on sheep's fleeces rather than on carrion are not fully elucidated, but it is known that back strike is conditioned by the type of wool, the rainfall, the temperature, and the density of the fly population. Heavy autumn rains such as occurred in February and April, falling for five or more consecutive days, cause irritation of the skin and attraction of the flies. If the fleece be dense the moisture is retained and the high humidities of autumn delay evaporation.

Fly Strike and Fleece-rot.

Merino and comeback sheep in Westland or on the east coast, where the rainfall was equally as high as that in the affected territory, would have received a severe strike if rainfall were the only factor involved. As it was, they were unaffected, so that the distribution of rain and of fly populations must be important in determining outbreaks of strike. The rain apparently causes the breakdown of the yolk and surface layers of skin into attractive compounds similar to those occurring in urine-staining. Following the dermatitis there is a growth of bacteria, some of which may produce discoloration (green, red, or yellow). This dry yolk or fleece-rot usually marks the period of wetting of the wool, and does not necessarily attract flies at a later time. Fly strike and fleece-rot appear, therefore, to be due to the same set of conditions.

In Marlborough it was in Merino hoggets that back and tail strike took place, although a few older sheep also suffered. Half-breds were not at all seriously attacked, even where they grazed on Merino country. In Canterbury, however, half-breds sustained a particularly heavy back strike during March. There is no obvious reason for Marlborough half-breds being nearly free from the back strike.

Heavy Rainfall.

During the two back-strike months the rainfall was heavy. At Waihopai, in

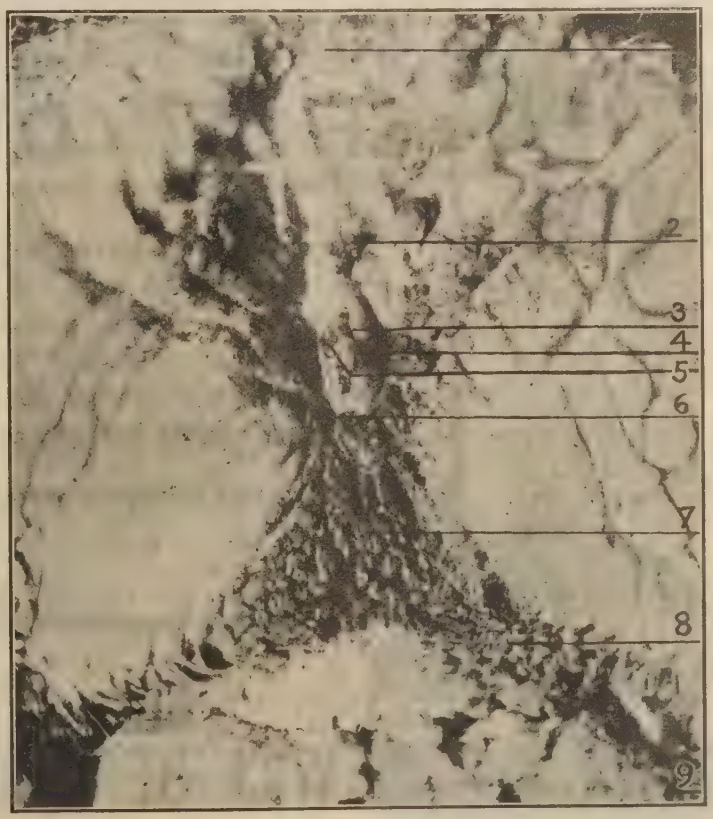

Fig. 1.—(1) Under-surface of tail with broken skin; (2) anus; (3) irregular thickened labia; (4) tip lost; (5) scabs; (6) urine staining and dermatitis; (7) pus and dermatitis under wool; (8) lateral extension of broken skin and urine stain; (9) sheep's leg.

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the centre of the Merino holdings, there were 5·2 in. in February, 5·9 in. in April, and 31·5 in. for the year 1st July, 1937, to 30th June, 1938. Strike set in on each occasion after a period of five days' rain, and both temperatures and humidities were high during April. The temperature, in fact, fell little below the monthly mean for summer. Conditions were therefore ideal for fly attack. On rams' heads, on withers and back, and on the tail between wrinkles where water ran down from the rump there was sufficient decomposition to favour strike.

All stations or blocks on similar country with similar sheep were, however, not equally affected. Neighbouring Merino flocks showing almost identical proportions of sheep with fleece-rot have suffered very different amounts of back strike. In these cases the dry yolk is regarded as an indication of susceptibility to fly attack during a rainy season, but not as the cause of the strike. The irregular nature of strike waves has not been explained.

Fig. 2.—(1) Urine-stained wool; (2) lower (left) labium; (3) twisted tip.

Control.

(1) Fly Population.

Experiments have been carried out in Australia on fly trapping, and some of them indicated that a concentration of one trap to 10 acres or 15 acres might reduce the strike by half. Trapping was undertaken in Marlborough partly to observe the effect on strike of a reduction of the fly population, and partly to study the seasonal fluctuation of the species of flies. The strike which took place among the comeback hoggets on the experimental property was slight until weaning, but it was somewhat heavier on the trapped area than on the untrapped blocks.

There was insufficient strike for a proper test to be made, but trapping did not give noticeable protection, even though more than two million flies were removed during the season. It would cost about £50 to provide efficient traps, bait, and labour to trap a 300 acre block during the six months of the fly season. Such a programme is unwarranted for some time yet.

Control of strike must therefore come from a regulation of the condition of the sheep so that it acquires as few susceptible areas of crutch or back as possible.

(2) Crutching and Shearing.

Crutching and shearing are efficient means of keeping crutch strike in check. A large amount of strike took place in January and February, partly because the hoggets were not crutched early enough. The custom of crutching is growing, and even the mild 1938 fly period showed that a thorough crutching at the end of December or early in January gave considerable protection. Among both half-bred and Merino holdings it was found that twenty flocks crutched in the first week of January or before sustained only half the amount of fly attack sustained by nine flocks crutched in February.

Repetition of crutching each two months is necessary if sheep susceptibility is to be kept low by drying out any urine stain that may have formed on the crutch. In a bad year crutching would have to be monthly.

(3) Jetting.

Jetting was tried by several owners during the season. A 1-per-cent. solution or suspension of arsenic gives about the same length of protection as crutching, but it is quicker and cheaper to apply. Jetting of the backs of hoggets will be necessary in some Merino flocks as a preventive to back strike. The procedure has not been tried in Australia, but the season's trials in this country were satisfactory. After using calcium arsenite suspension (1-per-cent. arsenious oxide) there was no noticeable damage to the wool or skin, the sheep were not struck, and nearly half the arsenic remained after two months, as calcium

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Strike is commonest on the neck, withers, rump, and tail, and those are the regions where the suspension should be applied most thoroughly. Rams' heads may be dealt with in the same way. This method of prevention is applicable while a strike is still in progress, but the arsenic should not be used on sheep already carrying strike lesions, because of the probable absorption of arsenic through the broken skin.

(4) Operative Procedure.

Operative procedure should prove useful among the Merinos and some half-breds. The hoggets should be crutched in January, and at the same time the medial crutch wrinkles and tail wrinkles could be removed with secateurs. The effects of the operation are permanent, and the injury is slight. It has been shown in Australia that more than half the crutch strike is eliminated by these means.

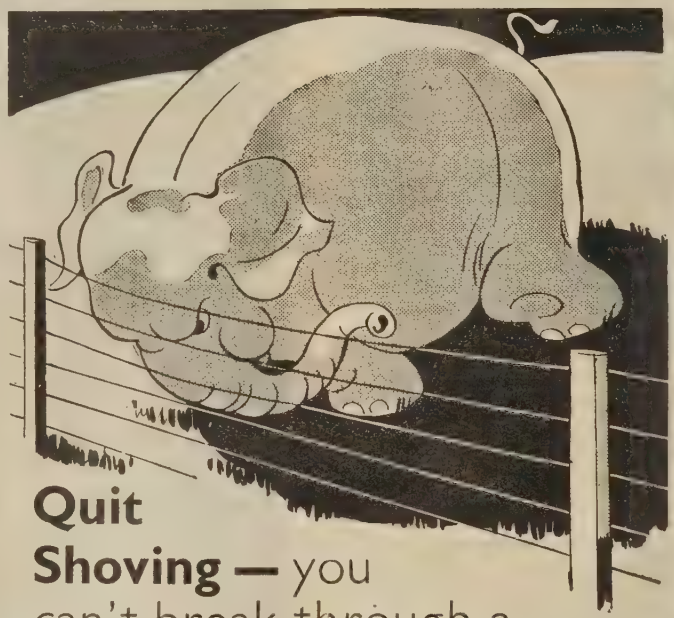
Vulval Malformation.

None of these methods deals satisfactorily with vulval malformation. It has yet to be learnt whether there is inheritance of the asymmetrical vulvæ. Wrinkles are hereditary features, and are being reduced by selective breeding. It has still to be ascertained whether the gross disconformities of the vulva would also yield to breeding-practice. The increasing tendency to use plain-bodied Merinos is sound practice, partly because of the better sale of such sheep, and partly because of their greater resistance to fly attack. The breeding of half-breds also requires attention in relation to strike susceptibility.

Conclusions.

The question of fly control is bound up with farm economics. At present there is no general panacea for the attacks of blowflies, so that the costs of the various preventives must be balanced against the losses of sheep, wool, and labour involved. Accurate yearly estimates of fly losses are essential to the individual farmer in his determination of the extent to which he can economically spend money on the prevention of strike. Records of losses sustained will also assist future investigation in gauging the trend of fly parasitization.

Some or all of the control measures should be employed according to the amount and nature of strike. In general, these involve early and regular crutching of lambs, autumn jetting against back strike, surgical removal of crutch and tail wrinkles, careful tailing and crutching, and breeding away from susceptible forms of sheep.



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Potash Trials in North Taranaki.

Increased Fertility and Production.

A. G. Elliott, Instructor in Agriculture, New Plymouth.

Fig. 1.—Showing the potash response on a typical dairy-farm.

FROM data obtained from the small observational pasture top-dressing trials it was considered advisable to explore the potash response throughout the instructorate, and one hundred ½ chain square plots were laid down on farms situated in practically every district from Pukearuhe round the coast to Oaonui, and inland as far as Huinga.

Each field had been top-dressed with lime and phosphate for at least the previous three years, and this was continued over the small plots, on which 30 per cent. potash was applied during this investigation. The small squares were top-dressed at the rate of 2 cwt. per acre, commencing in July, 1934, and at least two inspections were made each season, top-dressing being discontinued as a definite response was recorded.

The comparatively late application of potash in the first season, followed by an unusually dry spell, undoubtedly affected responses in the first year, when only twenty-three plots were discontinued. In the autumn of 1935, of the original number, sixty-eight were again top-dressed, and from observations on this second application only forty-one were continued for a third season, of which fifteen showed a definite response. A general outline of results from this investigation was published in the February issue of the *Journal*, and the data secured was undoubtedly of value not only as a guide to farmers, encouraging them to make field trials on their own holdings, but also in providing a basis for future investigational work.

The beneficial results of top-dressing with potash were disclosed in trials conducted by the Fields Division in North Taranaki. With the co-operation of a number of farmers in the district, trials were carried out over a wide area, and this article records the fact that, in general, the application of potash resulted in raising fertility and increasing production per acre under efficient management.

Grazing Trials.

Concurrently with the response survey described above, two grazing trials were conducted on the typical dairy-farms of Messrs. F. Bracegirdle, Kaimata, and J. Shepherd, Tariki. In each case a field representative of the grazing-area was subdivided into equal parts by the farmer, who each year continued his usual top-dressing over the whole paddock. Commencing with the spring of 1934, sufficient 30-per-cent. potash was supplied to top-dress one of the subdivided areas each season at the rate of 2 cwt. per acre. These trials were inspected at monthly intervals, when grazing-day figures recorded by the farmer were collected and summarized.

Farmers' Experiences.

The following details show the result of potash top-dressing as an addition to the usual phosphate applications during the period of the trial.

Mr. F. Bracegirdles's farm contains 117 acres, of which 102 acres are annually top-dressed, and the area is well subdivided and provided with adequate shelter. During the trial the number of cows milked varied from sixty to seventy, the quantity of butterfat produced being as follows :—

	lb.
1934–35	18,884
1935–36	18,873
1936–37	20,235
1937–38	20,100

The average butterfat per cow from sixty cows under test during the season just concluded was 350 lb.

Cow-days per Acre.

Period.	Potash.	No Potash.	Difference in favour of Potash.
1934–35	328·1	279·3	49·8
1935–36	422·6	346·3	76·3
1936–37	426·8	383·5	43·3
1937–38	397·6	299·5	98·1

Total increase from 8 cwt. potash, 267·5 cow-days per acre

Average increase from 1 cwt. potash, 33·6 cow-days per acre.

Phosphate Applications.

The phosphate applications on each field (6·1 acres in area) during the trial were 4 cwt. superphosphate per acre in April, 1935, and 6 cwt. basic slag per acre in April, 1936, followed by 5 cwt. basic slag per acre in May, 1937, while fields were harrowed or topped as required. At the last inspection there was a marked difference in favour of the potash area in sward constituents, clover growth, and general vigour, indicating that there was a possibility that an additional increase in grazing-day figures might have been achieved if sufficient dairy stock had been available.

Mr. Shepherd's Farm.

Mr. J. Shepherd's farm is 249 acres, of which 200 acres are annually top-dressed, while the formerly deteriorated swards are being rejuvenated by drastic harrowing and surface-sowing with marked success. The number of cows milked during the trial, together with butterfat produced, are as follow :—

	Cows.	lb. Butterfat.
1934–35	110	27,256
1935–36	120	30,301
1936–37	128	37,399
1937–38	132	42,012

Applications of phosphate on each area of 3·8 acres were : July, 1935, superphosphate at 5 cwt. per acre ; April, 1936, basic slag at 5 cwt. This was followed by superphosphate at 5 cwt. per acre in October of the same year. On 7th June, 1937, a mixture of superphosphate at 2½ cwt., plus phosfull at 2½ cwt., was applied.

The difference in favour of the potash sward has been consistently obvious throughout the trial. Although a number of reasons may be advanced for the fact, there was a marked deterioration in tne non-potash field due to grass-grub attack, the effect being scarcely noticeable in the adjoining area. However, both were drastically harrowed and surface-sown on

Fig. 2.—Cows on a potash area on Mr. F. Bracegirdle's farm, Kaimata. No potash was applied on the left.

Sowing 17 acres per hour

... 1 acre every 3½ minutes ...

with lime and super

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1st October, 1937, when 3½ cwt. per acre of superphosphate was applied with the seed, and good takes resulted generally.

Cow-days per Acre.

Period.	No Potash.	Potash.	Difference in favour of Potash.
1934–35.. ..	288·4	335·4	47·0
1935–36.. ..	209·9	331·1	121·2
1936–37.. ..	177·9	261·3	83·4
1937–38.. ..	291·4	422·8	131·4

Total increase from 8 cwt. potash, 383 cow-days per acre.

Average increase from 1 cwt. potash, 47·9 cow-days per acre.

Fig. 4.—Fields on Mr. Bracegirdle's farm—left, no potash; right, potash-dressed.

Profitable Investment.

In considering the results obtained from these grazing trials it should be noted that there was a wide variation in climatic conditions during the period, which commenced with an abnormally dry spell and was followed by generally abnormal seasons. In spite of these factors, the increases shown in cow-grazing days, taken in conjunction with the butterfat production from each farm, are definitely payable, as, with normal management and utilization, an expenditure of approximately 7s. 6d. per acre on potash, in addition to phosphates, returned an equivalent in butterfat worth about £2 per acre on the Tariki area and £1 10s. per acre at Kaimata. It should also be pointed out that in the results shown no account has been taken of the dry-stock grazing, as these figures could not be practicably incorporated in valuing the increases secured from the potash application.

During these trials both co-operating farmers were at times put to considerable inconvenience in subdividing the trial areas, in carrying out the necessary top-dressing, in dividing the herd to secure efficient utilization, and in keeping grazing records, and for these services the grateful thanks of the Department are extended to Messrs. Bracegirdle and Shepherd. Appreciative acknowledgments are also made to all farmers throughout the various districts who actively co-operated in the trials with ½ chain squares by making areas available for top-dressing during the three years of this preliminary investigation.

Sales of Potash Increase.

As a result of the investigations already described, and also following returns secured by farmers themselves throughout this territory, sales of potash have increased to a marked extent during the last few years. This is applied either in proprietary lines or as a farmer's own mixture, the 30-per-cent. salts being in popular demand. The value of the latter fertilizer as compared with the muriate and sulphur forms appears more evident, as the trials now nearing completion on the Katere area and Stratford Demonstration Farm indicate.

Additional trials on these subsidized areas in connection with the optimum times of application of 30-per-cent. potash on areas top-dressed in the autumn with 3 cwt. superphosphate will be finalized next year, when the results will be published. Similarly, other areas on which this form of potash in quantities of 1 cwt., 2 cwt., and 3 cwt. per acre is being top-dressed will be reported upon in due course.

In general, where potash gives a response, the early effect is in the clover increase, giving better bottom growth, suppressing weeds, and supplying general vigour to the sward. This is followed by increased palatability and heavier grazing, this again raising fertility and increasing production per acre under efficient management. From evidence now available it is obvious that in many districts potash applications, following many years of lime and phosphate top-dressings, are amply payable, and the fertilizer has become a valuable ingredient in pasture top-dressing mixtures.

Fig. 3.—Fields on Mr. J. Shepherd's farm, Tariki. Potash has been applied on the left and not on the right.

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Restricted Rations and Bacon Quality.

C. E. Ballinger, Assistant Experimentalist, Ruakura Farm.

THE present-day demand for meat tends more and more to the small joint with a maximum amount of lean meat and a minimum amount of fat. This applies particularly to bacon, and as New Zealand is anxious to build up her pig industry, and in the face of keen competition for bacon, she must be prepared to satisfy the demands of the British market.

Standards by which pig carcasses are judged are now in operation, and all have one end in view—the encouragement of the production of the long, lean type of pig with a maximum of side and hind-quarter, a minimum of fore-quarter, and a definite amount of back-fat.

The common complaint against New Zealand bacon is that it is too fat, and to remedy this New Zealand has adopted the Canadian system of pig-grading, which grades the carcass on the thickness of the back-fat at the third and last ribs. As, in general, the long-bodied pig has less fat than a short, thick-set one, the selection of a longer type of pig than has been the practice in the past will eventually solve the problem of excess fat to a great extent.

Improving the Grading.

Breeding and type selection, however, take time, and what is required is an immediate method by which New Zealand can improve her grading from about 40 per cent. first-grade to at least double the figure. One method by which grading returns of 40 per cent. No. 1 Prime can be doubled to 80 per cent. or better is by feeding a restricted fattening ration in place of the "full-fed" ration which is the usual practice at present.

In all countries where high-quality bacon is produced some form of restricted feeding is practised, either throughout the fattening-period or over the latter part of it. So far little attention has been paid to restricted feeding in New Zealand, due largely to the fact that the chief source of pig-feed, skim-milk, is still looked upon to a great extent as costing nothing—a waste by-product—and the pig regarded as a necessary evil to get rid of it. Seasonal dairying, with its spring peak of production, has also made pig-fattening a race to the fattest. With the introduction of grading and a cash premium for quality, as shown by back-fat, the difference between a first- and second-grade pig is about 5s., and about 10s. between a first- and third-grade.

Trials at Ruakura.

This premium makes it worth while exploring any means of obtaining it, and trials carried out at Ruakura have been and are being conducted to give information on this problem of excess back-fat. So far the trials have shown that if pigs are fed a fattening ration reduced to 75 per cent. of what they will eat if they are given the opportunity there is a definite reduction in back-fat at the shoulder of $\frac{1}{8}$ in. to $\frac{1}{4}$ in. and about $\frac{1}{8}$ in. at the loin, enough to double the grading returns of No. 1 Prime.

These results have been obtained irrespective of the kind of ration fed and with both cross-bred and purebred pigs. In some instances spring-born litters have been fattened from weaning. In other trials autumn litters have been over-wintered in store condition for three months and fattened the following spring. Trials have also been conducted in which the ration consisted of up to 50 per cent. of the total as roots. In others, the pigs were fattened on maize corn and skim-milk. Trials under stied versus open-air conditions have also been conducted, and the results in all have been similar.

The following table summarizes the results of trials carried out on the effect of feeding a restricted ration. Where the fattening ration included roots the amount of feed is given in "units," and the following values are used: 1 gallon of skim-milk equals 1 lb. of meal equals 10 lb. of roots.

Results of "Full-feeding" and Restricted Feeding.

Group.	Treatment.	Fattening Ration.	Grading (No. 1 Prime).
			Per Cent.
1	Fattened from weaning ..	Fed skim-milk to 6½ gallons/pig	30
2	Fattened from weaning ..	Fed skim-milk to 4½ gallons/pig	95
3	Wintered as stores to 100 lb.	Full fed buttermilk	40
4	Wintered as stores to 84 lb.	Fed to 4 units	70
5	Wintered as stores to 120 lb.	Fed to 5 units	80
6	Wintered as stores to 100 lb.	Fed to 5 units	100
7	Wintered as stores to 122 lb.	Fed to 4 units	100

It will be seen that in order to obtain these results the ration has been restricted to a maximum of 5 units. While this reduces the rate of fattening from about 1½ lb. of live-weight a day to 1 lb. a day, the total food required is no greater for restricted feeding than for "full-feeding." Restricted feeding does, however, prolong the fattening-period by about three weeks, and provision for this must be made in the autumn, when the milk-supply is declining. It also necessitates an adjustment of pig-numbers, and, where three pigs are full-fed, four will be required to utilize the skim-milk with restricted feeding.

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In order that restricted feeding may be extended the following ration table is given, and the rations suggested are based on what has been found to give satisfactory results at Ruakura. The feeding is governed by the live-weight of the fattening pigs, and the outlay for the purchase of a spring balance or platform scales for periodic weighing is quickly recovered by way of better grading returns.

Ration Table.

Live-weight (lb.)	70	80	90	100	110	120	130	140	150	160	170	180	190	200
Gallons of skim-milk or pounds of meal per pig day	2¾	3	3	3¼	3½	3¾	4	4	4¼	4½	5	5	5	5

This table is offered only as a guide, and a considerable amount of work is yet to be done in order that the fullest use may be made of restricted-feeding methods. In the meantime the above restricted rate of feeding has given a marked improvement in back-fat reduction in pig-fattening trials at Ruakura.

Book Review.

"Diseases of Breeding-ewes," by A. Leslie, F.R.C.V.S.

J. E. McIlwaine, Assistant Director, Live-stock Division.

THIS book on the diseases of breeding-ewes has been carefully prepared by the author from his own work and experience of New Zealand conditions. It is therefore a valuable contribution, and should be read by every sheep-farmer. The book is written in plain and non-technical language, and should be understood by every one who has had any experience in the management and feeding of a flock.

The book is well itemized, the paragraphs are short and pithy and suitably headed, and the illustrations are excellent.

There are some farmers in the North Island who will not entirely agree with the author's views of pregnancy toxæmia of ewes. At the same time the author is to be commended for his forcible presentation of a more rational system of feeding of the pregnant ewes.

The book should prove of value to the student and to the sheepowner. The observant stockowner should be able to follow the symptoms of the various diseases as outlined by the author, and with this knowledge take steps to control and reduce his breeding difficulties.

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Economic Farm Buildings.

A. S. NASH, Instructor in Agriculture, Rangiora.

WHILE it is a farmer's ideal to have his property provided with ample shed space, too often financial reasons prevent him from putting his plans into operation.

There is a continuous battle against the elements, and every year rain and frost cause a considerable loss of farm-produce because of its being inadequately covered. Even on the best of farms one sees expensive implements left out in the open and rapidly deteriorating in value.

Fig. 2.—Situated in a well-sheltered position, this is a useful type of shed for storing potatoes. A section can easily be fenced off in front for early lambs.

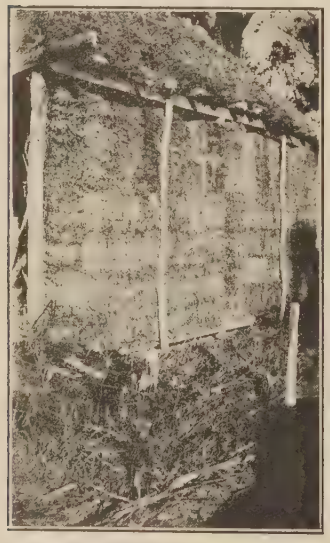

Fig. 1.—A shed with walls constructed of baled straw and No. 8 wire. The poles give extra support.

Potatoes, mangels, and hay all have to be protected from the weather, and although sheets and straw are used these temporary provisions are not always good enough.

Sheds from Straw.

In cereal-growing districts, where straw is plentiful, good sheds can be constructed at little cost with the aid of odd timber and trees. Such sheds are usually made with only three walls, and with the open side facing north. The rafters are made of tree branches, and are covered with a generous layer of straw. A neat job can be made by using eucalyptus poles 3 in. to 4 in. in diameter every foot, and then placing wire netting over the top to hold the straw. The studs to hold the roof must be substantial, and, if the shed is a large one, columns will be required to give extra support at intervals.

No definite design can be laid down for such a shed, but the one in the illustration showing a side wall was 30 ft. wide in front by 20 ft. deep, and the studs were 11 ft. high. Walls constructed of baled straw—three bales horizontal and one bale vertical—were wired together, and rested on a plate of 4 in. by 2 in. which was 8 in. off the ground. The bottom bale soon rots if in contact with the ground. The roof was constructed so that it was highest in the centre and sloped to the back and front.

Sheltered Position.

A shed such as this will store a large quantity of hay, but it should be built in a sheltered position. Smaller sheds usually have the roof sloping from front to back, and are not so high. The best method of putting on the roof is to construct the framework, and, when harvesting time comes, to build some wheat stacks handy to it so that the elevator of the threshing-mill can put on the straw direct.

Sheds such as these are very useful for sorting potatoes in wet weather, and can also be used as lambing shelters.

❖ ❖ ❖

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Regrassing Depleted Tussock Country.

Experiments to Produce Regeneration.

G. G. Calder, Instructor in Agriculture, Alexandra.

GENERALLY, the deterioration of the tussock country has been going on slowly and steadily for years. This is apparently due to consistent overstocking, combined with the fact that our indigenous grasses were evolved in the absence of the grazing animal, and it is only to be expected that the more palatable species would go out under heavy grazing-conditions.

Severe climatic conditions, burning, rabbits, short tenure of leases, and lack of fencing all play a part, but continual stocking appears to be the initial step in the slow deterioration of the tussock country. Just what constitutes overstocking must depend on the knowledge the runholder has of the different species comprising the pasture and the behaviour of those species under the local conditions of stocking.

Effect of Climate.

Dry, windy climatic conditions naturally accelerate the denudation of the tussock country, exposing the surface soil to erosion by wind and rain, or, in the absence of rain, the surface soil is dried out to such an extent that even the unpalatable species, the silver tussocks (*Pao caespitosa* and *Festuca Novae Zealandiae*), begin to die out (see Fig. 1). Finally, there is left a practically bare soil surface in a condition favouring erosion by frost, wind, and rain.

A late spring or summer burn, often accidental, is frequently the cause of rapid deterioration. The harm caused by burning is fully realized, but, on the other hand, neglect to burn in the early spring on areas which will easily carry fire is leaving the way open for rapid or total destruction in the summer through accidental burning. In short, a certain amount of burning in the spring may be justified as an insurance premium against total destruction during the dry months by the careless use of fire by musterers, hikers, &c.

Scorching of Seedlings.

Even with spring burning under favourable conditions the scorching of seedling plants must occur, and this, in conjunction with grazing, carries on the depletion of the native pasture.

Figure 1 shows a Central Otago area on which more than 50 per cent. of the silver-tussock plants have died after the more palatable pasture species have disappeared. Scabweed (*Raoulia*) can be observed coming in, and although it is certainly a check to erosion it is of no feeding-value. Figure 2 shows a denuded hill, and in the background scouring of the hillside can be observed.

> The possibility of tall oat-grass being used to form the basis of a seed mixture for the regrassing of depleted tussock country is being tested by the Fields Division on the Mount Pisa Flat. It is hoped that a species of this grass will prove a more valuable aid to regrassing than the silver tussock, which is difficult to reintroduce.

Bringing about Regeneration.

It is considered that the regeneration of the denuded and semi-denuded country can be brought about by—

(1) Completely closing up the country from the grazing animal for, say, two or three years.

(2) The surface-sowing of suitable pasture species which will stand up to the conditions.

Figure 3 (a) shows an area which has been closed up for three years and on which a good cover has been obtained, but the only native grasses to re-establish were the blue wheat grass (*Agropyron scabrum*) and *Danthonia semi-annularis* var. *nigricans*, and these very sparsely. It is, however, very doubtful whether this method would be practicable or economic, as, under grazing conditions, this class of pasture would disappear again in a few years unless the costly work of extensive subdivision were carried out.

Although the silver tussocks are of little value from a grazing point of view they are of immense value for regrassing, in that they provide shelter for better and more palatable species, conserve rainfall, collect moisture, and provide humus. Experience has shown that the reintroduction of the silver tussocks is a very slow process and a doubtful one on sunny faces or under dry conditions such as are found in Central Otago.

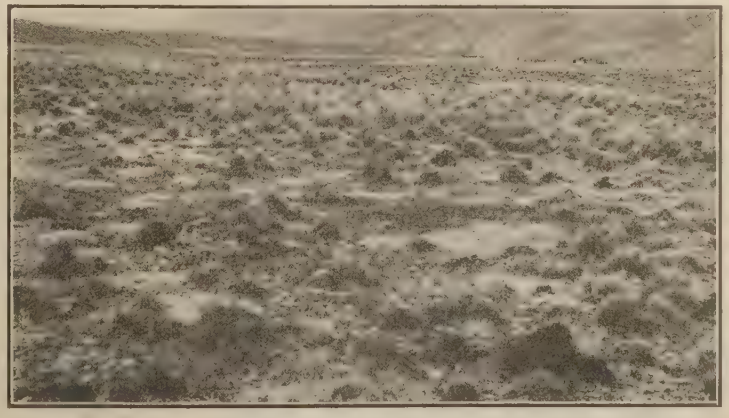

Fig. 1.—An area in which more than 50 per cent. of the silver tussock plants have died after the more palatable pastures have disappeared.
[*H. Drake, photo.*

Tall Oat-grass.

Figure 3 (b) depicts an area of surface-sown tall oat-grass which has been opened to stock and is growing under grazing conditions. Tall oat-grass (*Arrhenatherum elatius*) has the good points of the silver tussocks and is a little more palatable, and it is suggested that tall oat-grass could take the place of the silver tussock and form the basis of a seed mixture for regrassing land of this nature.

This theory is being tested on the Mount Pisa Flat, where work has been started in the regrassing of the deteriorated tussock country. Here, 30 acres have been obtained by the Fields Division of the Department of Agriculture. Five acres have been fenced, and most of it was sown down in plots last autumn. A large number of pasture species are being grown to test their ability to survive under Central Otago conditions. These have and are still being collected from Europe, Asia, North and South Africa, America, and Australia, and after proving their ability to grow they will be grazed to obtain information on their behaviour under grazing conditions.

Fig. 2.—Denuded or scoured hills.

[*H. Drake, photo.*

Fig. 3.—(a) An area which has been closed for three years. Only a partial coverage of native grasses has been achieved. (b) Surface-sown tall oat-grass growing under grazing conditions.

Briefly, the idea being followed at present is to collect and try out grasses from all available sources, particularly those from regions of low rainfall, and by a process of elimination possibly to narrow the number down to a few which by surface-sowing will produce a permanent sward capable of persisting and maintaining itself under grazing conditions.

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Half-yearly Fertilizer Returns, 1938.

THE following returns have been compiled by the Inspector of Fertilizers, Fields Division, Department of Agriculture, from figures furnished by courtesy of the Comptroller of Customs:—

Fertilizer.	Origin.	January.	February.	March.	Quarter.	April.	May.	June.	Quarter.	Half-yearly Return.
		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Phosphates—										
Rock	Gilbert and Ellice Islands	16,402	..	5,852	22,254	5,854	1,500	18,562	25,916	48,170
	Nauru	3,821	10,524	10,310	24,655	28,801	10,319	14,727	53,847	78,502
Total		..	..	..	..	..	..	..	..	*126,672
Slag	United Kingdom	1,628	4,658	425	6,711	6,342	5,395	400	12,137	18,848
	Belgium	6,070	16,087	19,300	41,457	9,621	1,640	2,490	13,751	55,208
Total		..	..	..	..	..	..	..	..	74,056
Guano	New Caledonia	222	..	111	333	..	420	349	769	1,102
	Seychelles	..	..	..	..	2,403	4,997	..	7,400	7,400
Total		..	..	..	..	..	..	..	..	8,502
Other phosphatic manures	United Kingdom	50	..	..	50	..	..	..	..	50
	Belgium	525	575	1,777	2,877	600	25	200	825	3,702
Total		..	..	..	..	..	..	..	..	3,752
Total phosphates		..	..	..	..	..	..	..	..	212,982
Potash—										
Kainit	Germany	..	95	17	112	..	..	..	..	112
	France	..	..	26	26	..	..	..	..	26
Total		..	..	..	..	..	..	..	..	138
Sulphate	France	..	20	75	95	..	10	130	140	235
	Germany	84	27	128	239	8	75	80	163	402
Total		..	..	..	..	..	..	..	..	637
Muriate	France	10	..	..	10	..	5	10	15	25
	Germany	..	..	49	49	..	..	..	..	49
Total		..	..	..	..	..	..	..	..	74
Other potash	France	390	1,220	555	2,165	220	..	330	550	2,715
	Germany	700	2,295	892	3,887	550	..	262	812	4,699
	Belgium	..	..	10	10	..	..	..	..	10
Total potash		..	..	..	..	..	..	..	..	8,273
Nitrogen—										
Sulphate of ammonia	United Kingdom	575	100	325	1,000	225	..	900	1,125	2,125
Nitrate of soda	Germany	75	..	10	85	..	2	..	2	87
	Chile	661	359	..	1,020	44	63	43	150	1,170
	United Kingdom	..	..	..	..	..	..	4	4	4
	Norway	..	..	..	..	..	..	1	1	1
Total nitrogen		..	..	..	..	..	..	..	..	3,387
Miscellaneous	United Kingdom	1	30	25	56	26	..	4	30	86
	Australia	..	3	..	3	..	..	..	..	3
Total miscellaneous		..	..	..	..	..	..	..	..	89
Totals		31,214	35,993	39,887	107,094	54,694	24,451	38,492	117,637	224,731

* Equivalent to approximately 252,000 tons of superphosphate.

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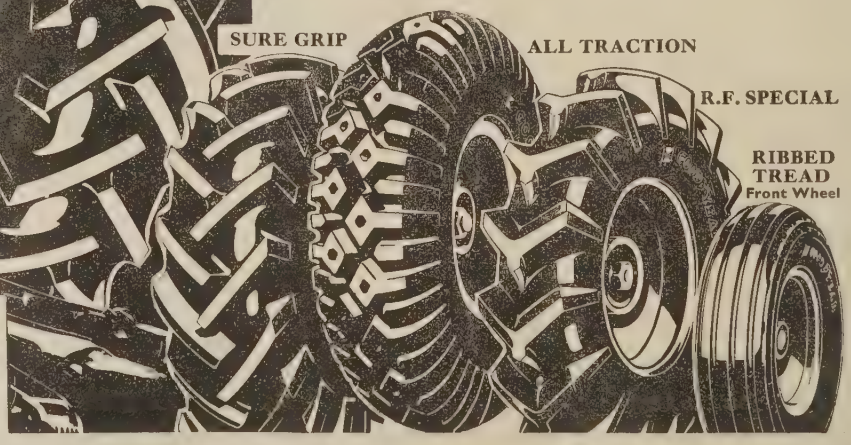

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TRACTOR TYRES

Annual Crops for North Auckland.

Scope for Intensifying Cropping Methods.

E. H. Arnold, Instructor in Agriculture, Dargaville.

WHILE more than 1,250,000 acres are in permanent pasture in North Auckland, less than 5,000 acres are sown annually to summer-growing crops. Swedes, turnips, and related crops occupy 2,500 acres to 3,500 acres; maize for green feed and grain, 500 acres to 1,000 acres; potatoes (insufficient for local consumption), 300 acres; and mangels only 70 acres to 80 acres. Other crops include carrots, pumpkins, artichokes, Japanese millet, and sorghum.

The high-rainfall conditions experienced in the North have determined that farmers place their reliance for feed for stock on permanent grassland. While a general extension of cropping is not advocated, ample scope exists for intensifying cropping methods to bring about increased yields.

Maize Crops.

The maize crop, however, is one which could be widely grown on farms where pigkeeping is undertaken in conjunction with dairy-farming. Feeding trials carried out at the Northern Wairoa Experimental and Demonstration Farm, Dargaville, during the past winter, have shown that pigs fed on maize, with access to grass paddocks and provided with suitable housing to keep them off the wet land during periods of adverse weather conditions, will winter in a thriving condition and be suitable to carry on to bacon weight when skim-milk supplies become available in the spring.

Most dairy-farmers can find an acre or two on which to grow maize for pig-feeding without much cost, except for extra work, which is already available on the farm. Farm-grown maize will obviate the necessity for the disposal of light porkers and stores at unremunerative prices in the autumn and the subsequent purchase of costly stores in the spring. Where pigs are carried through the winter, an ample supply of maize in the cob makes all the difference between existence and growth of the pigs, and fewer deaths will occur.

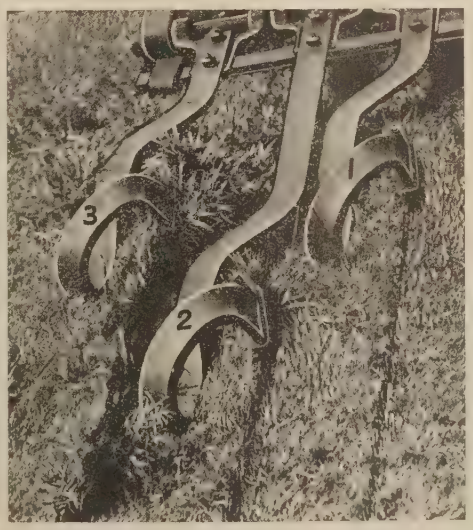
Cultivation.

Thorough cultivation is essential to ensure a full yield from crops. Good seed, good land, and the liberal use of fertilizers are, to a large extent, wasted if the preparatory cultivation is not thoroughly performed. Deep as well as complete cultivation of the seed-bed is most necessary, and unfavourable conditions which may occur later will not affect yields to so great an extent.

Most crops in the North, especially swedes and turnips, are sown broadcast. While this method may prove worth while in many cases on hill land where a crop is being grown prior to sowing down to grass, greater results attend the sowing of crops in wide rows, followed by ample intercultivation, where smaller areas are sown to crops on the more intensive farm. The intercultivation destroys weeds, especially paspalum seedlings, and conserves moisture.

Light and Heavy Soil Areas.

On the light-soil areas—and only a small proportion of North Auckland land comes into this category—where crops are to follow grass, the land can be skim ploughed in June or July and deep ploughed early in September and worked down with the roller, disks, and harrows. On the heavy land, the first ploughing during the late autumn or early winter–



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resulting in a winter fallow—followed by the second ploughing in September or October, as soon as the land is dry enough to work, results in good crops.

Farmers who intend cropping some portion of their land and who have not yet undertaken any preparatory cultivation work are urged to take the first opportunity to work their land to ensure the maximum cultivation possible before sowing. In some cases it may prove wise to reduce the area to be cropped and put all the work possible into a smaller area.

Overcoming Competition from Paspalum.

Many farmers in the North are loath to crop even an acre of maize for winter feed for pigs because of the competition from paspalum in the growing crop. This is not at all serious if thorough cultivation is the practice. More trouble results from seedling paspalum plants growing from seed during late November and December than from existing old plants throwing up new growth. These seedlings can be dealt with by the inter-row cultivator or scarifier, which necessitates crops being grown in rows wide enough for this work to be undertaken.

Established paspalum, particularly if it is not forming a complete sward, can be dealt with by careful preparatory cultivation. A skim ploughing, followed by a disking and the burial of the cut-up turf by the second ploughing, destroys the old plants. If the land is too rough for skim ploughing, the first ploughing requires to be deep, followed by a shallow ploughing, and this leaves the old plants well buried out of the way.

Where only one ploughing can be given, perhaps the best method is to plough with a leaboard plough with a skim coulter attachment. The skim coulter takes off part of the top edge of the furrow, turns it down to the bottom, and prevents the paspalum from growing up between the furrow slices. Disking follows after ploughing in this manner so that no light at all can reach the paspalum roots. If the land is ploughed in the ordinary way the paspalum comes up between the furrow slices.

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Mare Thirty-six Years Old.

THE accompanying photograph is of a bay mare which is thirty-six years old, the property of Mr. C. H. Smith, Oxford.

The remarkable fact is that she is devoid of any upper incisor teeth, and the lower ones are mere stumps imbedded below the level of the gums. Her molar teeth are still in good repair, and consequently her gums in the incisor region cannot meet by 2 in. Thus, it is impossible for her to nip off herbage in the usual equine way.

However, she has developed the habit of using her lips and tongue (rather like a cow), and tears off the grass very successfully, as can be seen by the condition she is carrying, for she feeds practically exclusively on paddock grazing.

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Malting Barley in New Zealand.

Guide to Growers for High-class Grain.

J. M. Smith, Fields Superintendent, Dunedin.

(Continued from October issue.)

IN the threshing of barley, two other points of importance might be mentioned where the grower can help to improve the quality of the grain delivered to the maltster. Even with the most carefully built stacks there are at times sheaves on the stack bottom and on the roof that have been weathered and where the grain is discoloured and probably high in moisture content. At times these sheaves may even contain sprouted grain.

The number of such sheaves is seldom very high, and they should be discarded or put aside to be threshed at the end of the job, so that this grain may be held back for feed purposes. If damaged or weathered sheaves are threshed with the main line it is possible that this grain will result in the whole line dropping a grade, with a loss of 3d. per bushel. After threshing, care should be taken to see that the stack of bags is well covered to avoid any weathering or damage to the top or outside bags. With both stacks of sheaves and stacks of bags, a good bottom should be prepared before the stacking commences in order to eliminate or minimize damage to grain in the bottom layer.

Header Harvesting.

In recent years the header harvester has become a machine common in the barley-growing districts, but this machine does not make a satisfactory job when direct-heading barley (Fig. 1). It is extremely difficult to get a standing crop of barley into a satisfactory condition for direct heading, and frequently, where this method of harvesting is practised, much damaged grain results.

This machine can be employed to advantage, however, where it is used with a pick-up attachment following the windrowing of the crop (Figs. 2 and 3). Even under these conditions, however, the quality of the grain should be carefully watched during the harvesting, and adjustments made from time to time to ensure that undue damage is not being done to the grain. During the coming season direct-headed barley will not be subject to the conditions of the arrangement made between the growers and buyers, but will be considered "free" barley.

The procedure adopted by the Barley Advisory Committee in fixing the prices of barley is outlined in this article, which concludes the series commenced in the September issue. Growers are warned that in the coming season direct-headed barley will not be subject to the conditions of the arrangements made between growers and buyers, but will be considered "free barley." The article also sets out the grading standards which have been adopted by the Committee.

Because of the rather unsatisfactory state of the barley industry, and in an endeavour to bring about a better understanding between growers and buyers which would ultimately result in this country producing the whole of its malting-barley requirements, the Government in 1936 set up an Advisory Committee on which were representatives of the growers, the buyers, and the Department of Agriculture. This Committee has been singularly successful in bringing about a greatly improved set of conditions for the growing and trading of malting barley.

"Give and Take."

This Committee had no legislative powers, nor was it found necessary to introduce legislation to enable agreements to be reached, but the process of "give and take" was adopted, and, as a result, all parties are more or less satisfied with arrangements which have been made. It is not suggested that the position satisfies every individual grower, but it is much more satisfactory than it was before 1936. The main points of the agreement between growers and buyers are—

(1) The introduction of an independent grading authority to decide in any dispute as to malting quality, such decision to be based on a grading standard adopted by the Committee.

(2) The reinstitution of contract growing. Only malting barley grown under contract is subject to the price agreed on and to grading.

(3) The fixing of a minimum price for malting barley each season.

Fig. 1.—Direct-heading barley. Barley harvested in this manner does not come within the agreement made with the buyers of malting barley, and is regarded as "free" barley. *[H. Drake, photo.*

To honour this agreement the buyers agreed to make every endeavour to place contracts for the whole of their requirements each season, and the growers agreed to do all in their power to ensure barley of high malting-quality.

Grading is invoked only when a dispute arises between grower and buyer and when the parties are unable to agree as to the quality of the barley and the price to be paid.

Grades of Malting Barley.

The grading standards for the 1938–39 season are—

No. 1 grade shall be dry, plump, bright, sound, clean, and free from other grains.

No. 2 grade shall be dry, plump, sound, reasonably bright but not stained, reasonably clean, and free from other grains.

No. 3 grade shall be dry, plump, slightly stained, and reasonably free from other grains.

No. 4 grade must be reasonably dry, plump, and reasonably free from other grains; may be stained and weathered.

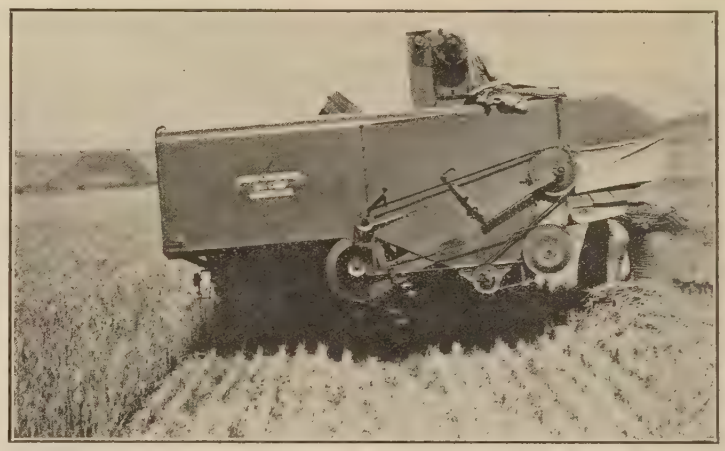

Fig. 2.—Using a header harvester with a pick-up attachment. Barley harvested in this manner is quite acceptable to the buyer.

[H. Drake, photo.

The maximum allowance permitted in each grade shall be as under (percentage of flinty grains to be expressed by count, all other percentages being in terms of weight) :—

	No. 1 Grade.	No. 2 Grade.	No. 3 Grade.	No. 4 Grade.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Flinty grain	10·0	20·0	35·0	50·0
Foreign matter (weeds, chaff, straw, &c.)	0·5	1·0	2·0	2·0
Wild oats	0·5	1·0	2·0	2·0
Skinned and broken grains	2·0	4·0	5·0	5·0
Tares and other round seeds	5·0	5·0	5·0	5·0
Sprouted grains	Nil	Nil	Nil	3·0
*Moisture	15·0	15·5	15·5	15·5
	lb.	lb.	lb.	lb.
Bushel weight	52	51	50	50
Disease	Trace	Trace	Trace	Trace

* A sample of barley containing more than 15·5 per cent. moisture, if it conforms otherwise to any of the grades specified, shall be accepted as being in that grade, subject to a mutually agreed upon deduction for conditioning when necessary, and that a deduction in weight will be made to bring the line in conformity with the standard of moisture reached by the line after conditioning.

Fig. 3.—The harvester picking up from the swathe after the crop has been cut with the binder and the loose material left lying on a high stubble.

[H. Drake, photo.

Prior to grading, all barley shall be screened through a 6A screen. The maximum amount of screenings permitted for malting barley shall be 20 per cent. Screenings under 20 per cent. subject to dockage at the rate of ½d. per bushel for every 2 per cent. over 5 per cent. On tares and round seeds left in the screened sample there shall be a dockage deduction on a weight-percentage basis at the rate of ½d. per 1 per cent.

Price Deductions.

The maximum district price is payable in respect of No. 1 grade only. The price for No. 2 grade is 3d. per bushel lower, the price for No. 3 grade is 6d. per bushel lower, and the price for No. 4 grade is 9d. per bushel lower, than the maximum district price in each case.

The following points in connection with these official standards should be noted :—

(1) With the exception of those relative to flinty grains, all grading percentages are to be calculated from the total weight of the screened sample, and to be the average of not less than three separate analyses.

(2) A 5 oz. sample is to be screened through a 6A screen, and dockage in accordance with the grading standards is to be made from the standard price for the district in which the line is graded.

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(3) *Flinty grains* are to be estimated with the use of a suitable grain-cutter, and the final percentage is to be the average of at least three separate cuts and to be expressed *by count*.

Classes of Cut Grain.

Three classes of cut grain are evident in the average sample :—

(*a*) Grain hard and completely flinty :
(*b*) Grain partially mellowed — part flinty and part floury :
(*c*) Grain completely mellowed or floury.

For the purposes of grading in respect of allowable percentages of flinty grain, only class (*a*)—completely flinty—are to be counted as such, classes (*b*) and (*c*) being grouped as floury.

(4) *Broken and Skinned Grains, Foreign Matter, Wild Oats, &c.*—The respective quantities of each are to be separated from the screened sample, the percentages arrived at by weight, and the barley graded as prescribed by the standards.

(5) *Tares and round seeds* are to be separated from the screened sample and a dockage deduction on a weight basis according to the grade to which the line conforms.

(6) *Moisture.*—Determined in accordance with the Carter-Simon method.

(7) *Bushel Weight.*—Estimated by the use of a chrondometer in the ordinary way.

(8) The Grain Merchants' Association's trading rules will apply in connection with all deliveries.

(9) *Disputed Samples.*—The party disputing the quality of the grain as determined by either the agent of the purchasing firm or by the grower may have the line submitted for official grading, in which case he applies to the Fields Superintendent, Department of Agriculture, at Dunedin or Christchurch, as the case may be, on forms obtainable from officers of the Department in the main barley-growing areas. The application must be accompanied by a grading fee of 10s. On receipt of the application and fees the Fields Superintendent will arrange for an official 1 lb. sample of the line to be drawn, sealed, and sent to the Seed-testing Station, Palmerston North, for official grading. The sample will be graded strictly in accordance with the grading procedure laid down, and the disputing party will be advised of the correct grade. If the contention of the party disputing the quality is sustained, the other party will be liable for the grading fee.

First-grade Prices.

With regard to prices, the prices scheduled below are the minimum prices which have been agreed upon for No. 1 grade malting barley (stack-threshed) :—

	Per Bushel. s. d.
Central Otago (on trucks)	5 4½
Southland (Garston), (on trucks)	5 0
Canterbury and North Otago (on trucks) ..	4 10½
Marlborough and Nelson (in store) ..	4 10½

Stack-threshing. — The period during which the barley must remain in the stack prior to threshing is at least six weeks.

Stook-threshing.—In all cases where a grower in any of the districts threshes his crop out of stook, a deduction in price of 3d. per bushel on the stack-threshed prices stated above may be made.

The following prices will therefore apply for stook-threshed barley :—

	Per Bushel. s. d.
Central Otago grown (on trucks)	5 1½
Southland (Garston), (on trucks)	4 9
Canterbury and North Otago (on trucks) ..	4 7½
Marlborough and Nelson (in store) ..	4 7½

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(Concluded.)

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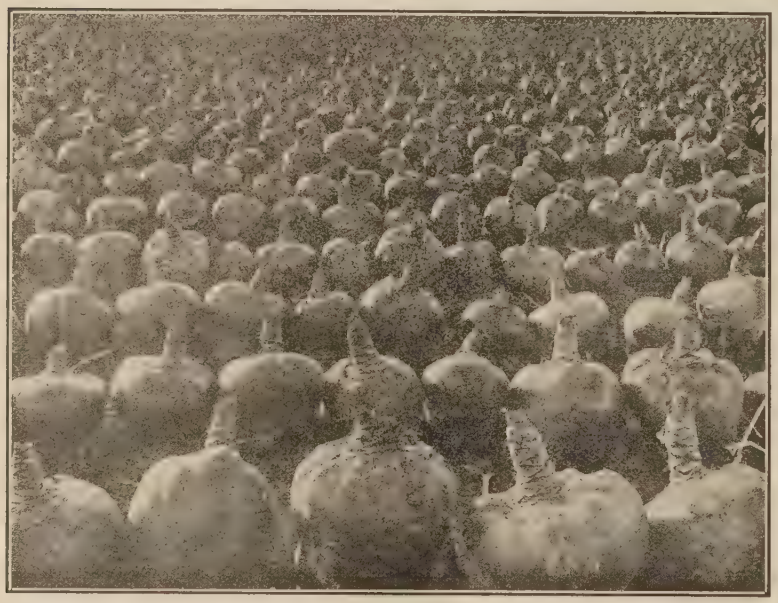

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Fig. 1.—Showing the cows feeding, with the feed rack immediately above.

Stall-feeding Dairy Cows.

Increase in Butterfat Production.

J. W. Palmer, Instructor in Agriculture, Hastings.

ONE of the wettest seasons in the Hastings district was experienced during the past autumn and winter. Drainage on the Heretaunga Plains was, in many instances, not of the best, particularly where the open drains were blocked with silt in the April floods.

On dairy-farms the water-logged condition of the pastures not only prevented growth, but also resulted in a severe cutting about of the sward by the stock. Farms in the lower-lying areas became a quagmire before the end of the spring, and weed-invasion, especially by buttercup, docks, and burr clover, is certain to be heavy.

Mr. A. J. Phillips, of Haumoana, made excellent use of a disused barn on his property for the purpose of avoiding, as far as possible, heavy stocking of his pastures in the spring. Concrete floors and forty-two stalls were put into the barn at a cost of about £100. Mr. Phillips was immediately impressed not so much by the avoidance of damage to the pastures as by the increase in butterfat-production with the stall-feeding of the usual winter ration of lucerne, hay, silage, and mangels.

> Many dairy-farms on the Heretaunga Plains, Hawke's Bay, suffered severely from the exceptionally wet autumn and winter this year. One farmer at Haumoana erected forty-two stalls in a disused barn to avoid heavy stocking of his pastures in the spring, and an increase of 82 lb. in butterfat-production was recorded in the first four days of stall-feeding.

Increase in Production.

An increase of 82 lb. in butterfat-production was recorded in the first four days of stall-feeding, which began at the beginning of August.

The food-supplies were placed along racks above the stalls and fed as required into long troughs in front of the cows. Only the milkers were stall-fed, and they were kept in the stalls for milking and feeding—a matter of two or three hours night and morning. They were turned out into convenient and drier paddocks for the rest of the time, and during very wet periods they remained in the stalls.

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As a result of stall-feeding a substantial area of the farm pastures was closed to stock and made good growth, which was later rationed to the milkers, being fed off with very little damage to the sward. Young stock and late calvers were fed and grazed lightly on some of the drier pastures, but they did nothing like the damage that forty-two cows would have done under the normal procedure of feeding out on the paddocks.

No Signs of Bloat.

Another feature of stall-feeding which is worthy of consideration is that, having had a ration of hay and roots or silage, the cows going on to fresh, succulent grass showed no signs of bloat or grass staggers which were previously quite common on this farm.

It is Mr. Phillips's intention to continue next season with the stalls, and the installation of a sump and liquid-manure pump is planned to ensure the manurial value of the food given in the stalls being returned to the pastures, as is done where feeding out on the paddocks is practised.

Fig. 2.—The paddock into which the cows were turned after being fed.

Although not likely to be adopted universally on flat land in New Zealand because of the fact that the expenditure in buildings is hardly warranted by the short period, such stall-feeding is an advantage. There are many properties, however, where the damage done to the pastures and the heavy loss in production where stock have no dry area on which to lie could be counteracted economically by the provision of a building suitable for stall-feeding in place of the usual walk-through cow-shed.

Fig. 3.—A view of the spelled paddock.

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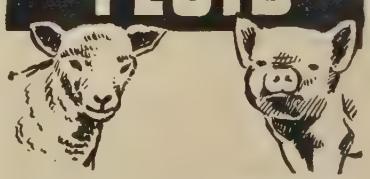

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Baling of Lucerne Hay.

Comparison of Methods and Costs.

G. G. Calder, Instructor in Agriculture, Alexandra.

Fig. 1.—A side-delivery rake raking the lucerne into windrows twenty-four hours after being mowed.

[H. Drake, photo.

THE value of lucerne for hay-production is well established, yet the area in lucerne is comparatively small. This is, perhaps, due to the fact that the whole area usually requires harvesting at about the same time, and that if this is delayed for a few days the resultant hay may lose a good deal of its value. Further, in handling the crop, unless conditions are ideal, there is frequently a big loss of the leaf, which constitutes the most valuable part of the hay.

A stand of lucerne should be harvested at the right stage to obtain the best results, and this frequently clashes with other seasonal work. Also, it should be got into the stack with the minimum of handling and delay to obtain first-class hay. This is, of course, realized by all farmers, but the time and labour required at, say, harvesting or shearing time probably restricts the area sown in lucerne. In fact, red clover is often sown in preference to lucerne solely because the farmer can put off the harvesting of the clover for a week or two without doing it much harm or, alternatively, delaying the time of harvesting or excluding harvesting operations altogether by grazing the area.

Range in Lucerne Hay.

The range in lucerne hay varies from little more than fibry stems to an article in which has been saved all the foliage. The class of hay to be made depends on the amount of handling it receives, the length of time it takes to cut and store it, and the stage at which the crop is cut.

The stage at which to begin cutting the lucerne depends on one or more of the three following points which may be observed. At the first sign of either of them the crop should be cut :—

(1) When the young shoots from the base or crown of the plants are showing up :

(2) When the bottom leaves on the stems are beginning to turn yellow :

(3) When 10 per cent. of the plants have begun flowering.

By baling the lucerne direct from the windrows a large area can be efficiently harvested and first-class hay produced with a minimum of labour and time and with practically no loss of leaf, although, naturally, this depends on fairly favourable weather conditions, which, however, can be usually depended upon in the majority of districts in the South Island.

Practical Example.

The following particulars and photographs were obtained on the farm of Mr. J. S. Hunt, Maungawera Valley, Central Otago.

The 28-acre paddock in question was stacked the previous season in approximately thirty hours with the following labour and equipment : Five men and a boy, one tractor-sweep, one horse-sweep, and a stacker with a truck for elevating the stacker. This season the same area was harvested with a baler and pick-up attachment in sixteen hours with four men and a boy. The crop was equally as good as last year, if not better.

Although four men can work the baling-machine, its travelling speed depends on the speed with which the bales

Fig. 2.—The baler with pick-up attachment baling the lucerne direct from the windrows forty-eight hours after being cut.

[H. Drake, photo.

can be wired, and here the boy was found useful. Windrows require to be fairly even, and in this particular case were made with a 14 ft. side-delivery rake. If the windrows are too big or very uneven the material is baled too quickly or spasmodically for the men to wire the bales, and the machine is held up.

Baling of the Hay.

The January cut was the quickest into the bale when the hottest weather prevailed. At this period raking into windrows was begun four to six hours after mowing, and baling began 1½ days after mowing. With the other cuts the time increased up to raking one day after cutting and baling two days after cutting.

The baling of the hay was started before it was in a condition to be stacked, but no heating of the bales was apparent, and the hay later turned out in excellent condition. Fine agricultural salt was used in the baling operations, and although this costs 15s. a ton more than the coarse salt there was less used and a better distribution given.

An indication of the stage at which baling can be started is obtained by observing the manner in which the pick-up attachment handles the crop. If the lucerne gets caught in the fingers of the pick-up or does not run up cleanly it is not ready and should be left until it does.

Fig. 3.—Another view of baler and pick-up attachment working in the paddock. Another paddock of lucerne ready for cutting can be seen in the immediate background. [*H. Drake, photo.*

Costs.

With the two operations by which the crop is handled twenty-four and forty-eight hours after mowing there is no loss of leaf and a first-class valuable hay is obtained. With the salting and the bales standing in the paddock for, say, another twenty-four hours or until baling is completed the chances of heating are reduced to a minimum. Labour-costs are reduced, and the time occupied in handling the crop is also substantially lowered.

Costs will depend on the size of the farm and the amount of hay to be saved annually. In Central Otago, where hay is the main and frequently the only winter feed provided, the time occupied in producing it and the quality of the product, cannot be readily estimated in pounds, shillings, and pence.

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WALLACE Haymaking Equipment

Fruit Cool Storage in New Zealand.

Improvements for Efficiency and Economy.

A. Powell, Cool Storage Officer, Wellington.

RECOMMENDED lines on which greater efficiency and economy might be obtained in the fruit industry may be summarized into five classes, which are as follow :—

(1) An increase in the number of district cool stores, and also improvements to our existing cool stores.

(2) A central concentration cool store for precooling export fruit is a necessity.

(3) Cool storage to be utilized for temporary storage for fruit and vegetables. This convenience is necessary in the central markets of the Dominion.

(4) Pear export regulations to deal with the precooling and packing of export pears.

(5) Strict attention to temperature is necessary when precooling pears for export.

District Cool Stores.

Auckland is well supplied with cool stores to meet present needs for precooling purposes. The district exported 5,763 cases of pears and 63,119 cases of apples this season.

Hawke's Bay is producing increasing quantities of pears for export, and also exported 303,095 cases of apples this season, the pears exported amounting to 45,578 cases. To precool pears before they are packed, Hawke's Bay will certainly need an increase in the cool-storage accommodation, with an increased amount of packing space and facilities necessary to carry out this work. A central cool store established on co-operative principles on a railway siding, as set out in this report, would prove to be a great asset to this very productive area.

Canterbury is at present well supplied with cool storage. A total of 33,903 cases of apples and 1,578 cases of pears were exported this season.

Nelson District.

Stoke is provided with precooling space by the Stoke Cool Storage and Freezing Co. and the Maitland Cool Stores. A total of 12,739 cases of pears and 257,493 cases of apples were exported from this district during the season.

A survey of the cool storage of fruit in New Zealand reveals that a considerable extension is desirable in the interests of efficiency and economy. Particularly is this so in the pear and apple export trade, and it is felt that no time should be lost in making a start on the lines recommended.

Mapua is the centre of a very large fruit-producing area, and should receive immediate attention with regard to cool-storage accommodation. The pear export this season amounted to 11,974 cases, and apples 363,183 cases. A co-operative cool store situated at the wharf would greatly assist the producers in this district.

The Motueka Co-operative Cool Store has given very fine service to this district during the past twenty-four years. This district produced 24,459 cases of pears for export and 308,573 cases of apples this season. Alterations and extensions are necessary to increase and improve both the precooling and packing facilities for precooling and handling pears for export.

Central Otago District.

Otago, Alexandra, and Roxburgh need cool storage to precool and concentrate soft fruits for local market requirements, and also for the storage of apples and pears for the same purpose. Alexandra, Clyde, Cromwell, and Omakau produce 99,964 cases of soft fruits, and Roxburgh produces 84,960 cases. These figures are for the 1936 season, when the crop was lighter than normal.

Pear Export.

To be completely successful, export pears must be precooled before packing,

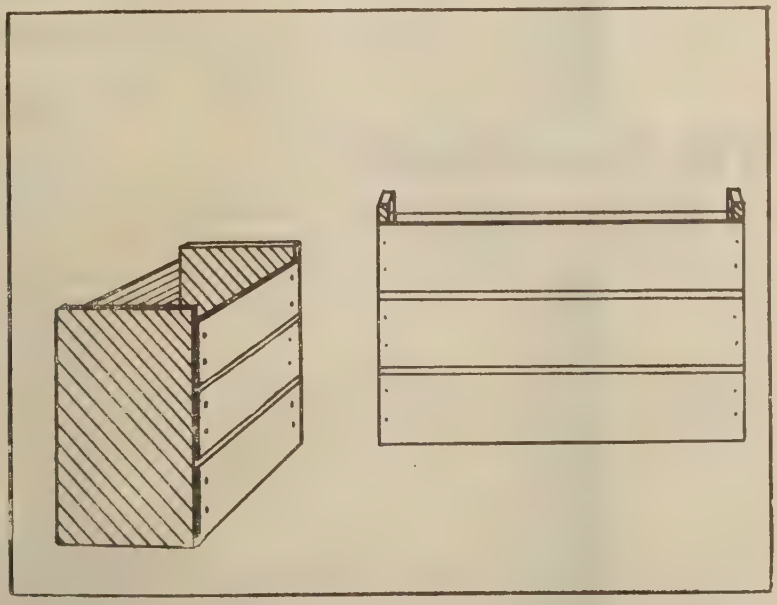


Fig. 1.—Showing orchard boxes made with long ends for ventilation purposes when stacked in cool storage.

so that good results are assured, and it is essential that there are cool-storage and packing facilities situated on a wharf or railway siding for convenience of loading. There are also other fruit-producing districts where improvements would be beneficial. Further, a central concentration precooling store is a vital necessity if we are to improve the condition of our fruit on arrival at the markets overseas.

Again, if any permanency of our export results with pears is to be obtained, greater care must be taken to precool them before packing and to hold them in cool storage right to the time of loading in the overseas vessel. District cool stores are also required to provide the precooling facilities without unnecessary labour and expense, and to improve the conditions near the point of production to deal with export pears.

The following is a description of the rules associated with the establishment of a co-operative cool-storage company on a basis that can be recommended for simplicity and for economical and efficient service to any district in which it is established.

The Co-operative System.

The system of co-operative cool storage, such as is found to be operating successfully in Motueka, is no doubt the best and most successful of the co-operative efforts established by the producers of fruit. An inspection of the rules governing the formation of this co-operative movement reveals that a shareholder is the owner of the amount of floor space, or case space, in the cool store which the number of his shares in the company represent.

The repayment of the principal and interest, and also working-expenses, is made by dividing the total amount involved by the number of shares in the company. It will be seen that each shareholder pays his share of all costs *pro rata* to his shareholding. The number of shares to be held by one shareholder is limited to his requirements for storage space for the fruit produced by him. Further, the number of votes exercised by the shareholder are regulated by the number of shares in his name.

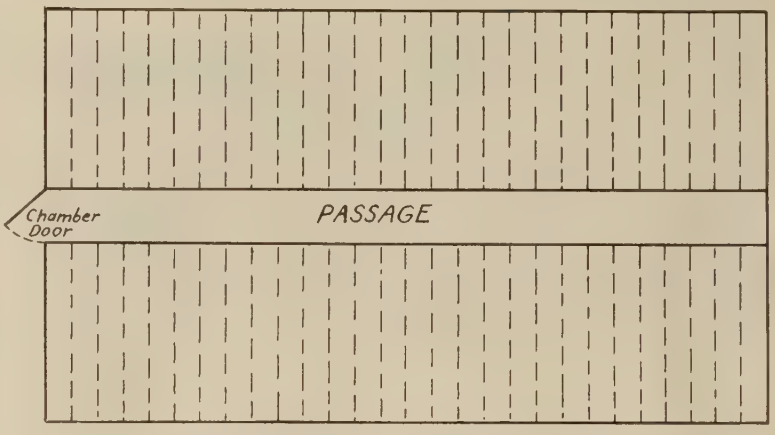


Fig. 2.—A diagram of the method of marking the floor for stacking in rows.

TRANSPORT WISDOM

Commonsense for National Welfare

Commonsense in transport is surely railway transport, especially in New Zealand, where the people own the railways and have them controlled by their own representatives for national welfare from all viewpoints.

New Zealanders can strengthen their own country by loyalty to their own railway system, which has largely formed the basis of the Dominion's industrial and social structure.

Your Railways for Your Welfare

Benefits to Small Owners.

This system of co-operation is recommended for the benefits it bestows on the owners of comparatively small orchards. It assists them to reduce overhead costs by reducing the cost of cool storage to them. They are the owners of their space, for the yearly repayment of loan-money is putting them in this position. Their shares have a definite value, which increases if their store is built in a convenient position for loading on rail or wharf :—

(1) For a minimum outlay they are in full control of cool-storage space needed for their requirements.

(2) They can place their fruit naked in cases when it is picked and do sorting, &c., on wet days, or when most convenient.

(3) The rules covering the efficient working of the store are compiled by themselves; their board of directors is elected to office by the shareholders themselves.

(4) Overhead expenses are reduced to a minimum, as a part-time secretary and full-time engineer are the only hands employed directly by the company.

(5) The shareholder takes the responsibility of closely watching his own fruit, and, as he stacks it in the store himself, this should assist him to avoid losses.

(6) The system of co-operation assists the growers of fruit to co-operate for their mutual advantage.

(7) The co-operative system lends itself as a sound investment for Government funds, and assists the producer to reduce his overhead expenses. It also helps him to buy his own storage space by an arrangement

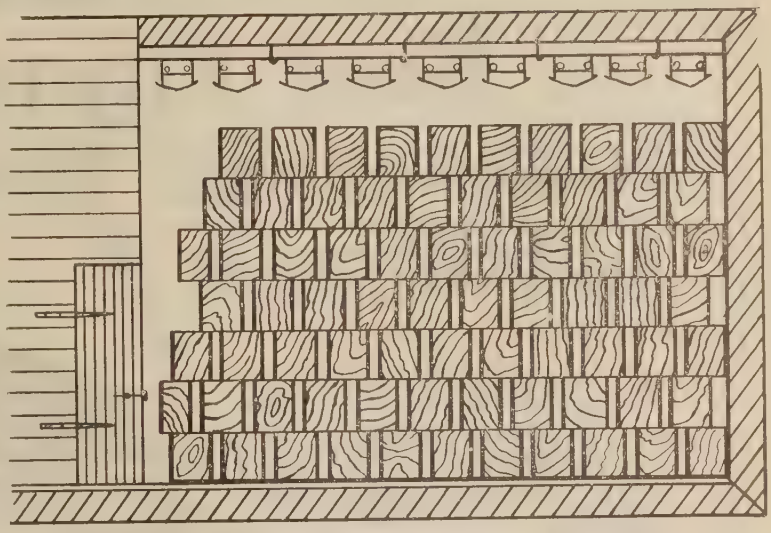
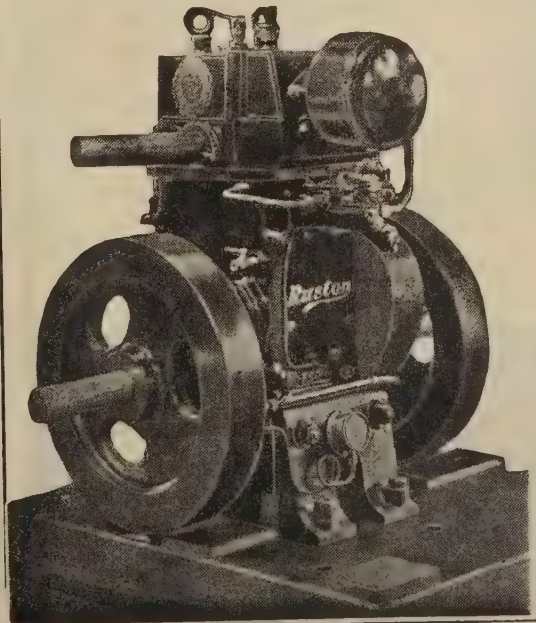


Fig. 3.—A sectional view of a cool-storage chamber, showing the correct method of stacking fruit in orchard boxes to avoid dunnage.

RUSTON · HORNSBY DIESEL · ENGINES.



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—It also provides a splendid jar for household use when empty.

Also 2oz. tins for 1/9.

Remember the name **BON-TON** if you want the best cigarette papers

Silver Fern
CIGARETTE TOBACCO

of terms of repayment of principal and interest yearly over a period of years at a reasonable rate of interest.

Suggested Regulations.

The following set of suggested regulations will prove efficient and practical for the precooling and handling of pears for export:—

(1) All pears must be placed in cool storage immediately after being picked.

(2) Pears must remain in cool storage for at least three days before being packed.

(3) The cool-storage temperature must be held at minimum 30° F., maximum, 32° F.

(4) The Fruit Inspector to inspect each line of pears for export befbre it is packed in order to indicate to the packer the grade and discuss with him the regulations as to the amount of blemish permissible.

(5) When packing pears for export the packer must not bring out more than twelve cases to be packed; they must be immediately replaced in the cool store when packed to remove the heat from the package.

(6) The Inspector must inspect all pears again after they are packed. This inspection should take place at the cool store.

(7) Packers must be instructed to avoid stem-punctured samples being packed.

(8) The Inspector must take records of flesh temperatures, and also the chamber temperatures where pears are being precooled, this record to be forwarded to the Head Office weekly during the pear-export season.

(9) Any breach of these regulations is to be reported to Head Office without delay.

(10) Consignments not to be packed longer than seven days before shipment.

(11) Insulated transport to be provided when pears for export are to be transported long distances.

Orchard Fruit Cases.

With the extension of cool-storage facilities available in the various fruit-producing district centres more inducement will be given to the grower to harvest and cool store his fruit in orchard cases. Preference should be given to the orchard cases after the type of the benzine box for this purpose.

This box, when made up with ends ¾ in. longer than usual, so that the long ends take the place of a cleat, can be filled to ordinary level without bruising the top layer of fruit when stacking. The long ends allow good ventilation between each case when stacked in cool storage chambers. The sharp edges of the timber for the sides, if rounded off before making up the case, is an advantage, as it ensures the fruit to some extent against bruising and marking. This case is strong, and, if given proper care, will last for years for orchard and cool storage purposes.

Ventilation between Fruit Cases.

The system of painting a white line on the floor of a cool chamber to represent the correct amount of vertical ventilation between each row of fruit cases has several advantages. The first of these is that the correct amount of ventilation is allowed for, and mistakes cannot occur when the cases are kept between the lines.

Secondly, a row may be commenced in any part of the room, and, when stacked between the lines, it will not throw the rest of the chamber out for stacking. It often saves much work entailed in shifting stacks of cases that are out of line. This is a method which will add to general efficiency.

Stacking Pears in Orchard Cases.

The method shown in the illustration is recommended, as good ventilation of each case in the stack is provided for and the stacks are held firmly in position without dunnage. Space is also left between each stack for further vertical ventilation.

Before being filled with fruit the cases should be lined with newspaper, which should be left long enough to fold over the fruit when the case is full and be held in position with a pear on top.

The most suitable varieties should be worked to increase the demand for our pears overseas so that we can supply larger quantities of those most sought after on the English and European markets. Concentration should be placed on six or eight of these varieties with a view to improving our pear-export trade.

Slaughterings of Stock.

THE following return of slaughterings of stock at meat-export slaughterhouses and abattoirs for the five months May to September, 1938, inclusive, have been compiled by the Live-stock Division:—

	Cattle.	Calves.	Sheep.	Sheep, of which Ewes.	Lambs.	Pigs.
North Island.						
Meat-export slaughterhouses—						
Auckland	58,868	434,130	63,630	42,993	34,796	70,555
Poverty Bay - Hawke's Bay ..	19,785	29,617	129,428	44,741	127,009	11,608
Taranaki-Manawatu ..	37,946	191,987	61,769	31,060	120,560	48,015
Wellington-Wairarapa	16,175	21,055	85,431	32,151	102,832	10,368
Totals	132,774	676,789	340,258	150,945	385,197	140,546
Abattoirs	52,579	17,859	153,715	90,001	9,453	37,602
North Island Totals	185,353	694,648	493,973	240,946	394,650	178,148
South Island.						
Meat-export slaughterhouses—						
Nelson-Marlborough	197	7,806	2,300	1,186	28,333	3,414
Canterbury	5,804	26,667	169,435	136,931	543,403	13,963
Otago-Southland	4,388	24,657	86,910	69,462	357,523	2,309
Totals	10,389	59,130	258,645	207,579	929,259	19,686
Abattoirs	26,827	5,805	113,733	59,302	7,630	11,391
South Island Totals	37,216	64,935	372,378	266,881	936,889	31,077
Dominion.						
Meat-export slaughterhouses ..	143,163	735,919	598,903	358,524	1,314,456	160,232
Abattoirs	79,406	23,664	267,448	149,303	17,083	48,993
Grand Totals	222,569	759,583	866,351	507,827	1,331,539	209,225
In addition, the following stock were slaughtered at rural slaughterhouses for local consumption during the three months ended 30th June, 1938	22,099	786	53,140	Not Known.	2,648	7,359
Same period, 1937—						
Meat-export slaughterhouses and abattoirs	237,172	787,336	692,872	379,764	1,433,144	233,044
Rural slaughterhouses for three months ended 30th June, 1937	22,513	637	54,253	..	2,057	7,311
Same period, 1936—						
Meat-export slaughterhouses and abattoirs	181,799	775,336	724,626	397,212	1,570,212	223,705
Rural slaughterhouses for three months ended 30th June, 1936	22,090	613	53,707	..	2,780	6,603

Certificate of Record Testing.

Dairy Division.

THE following list supplies particulars relating to cows which received certificates under the C.O.R. system during October. The outstanding performance is that of "Ashvale Dreaming Stella," whose record was commented upon in the August *Journal*. Taken as a whole, the current list is a very strong one, and it will be noted that several exceptional yields are included :—

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Fat.
YEARLY DIVISION.						
Jerseys.						
Junior Two-year-old.		Yrs. dys	lb.		lb.	lb.
Ashvale Felicity ..	J. and G. W. Dobson, Lepperton	1 355	275·5	365	9,376·1	602·64
Fairlands Dahlia ..	J. Klenner, Kaimata	1 330	275·5	365	8,873·0	546·09
Penrose Blonde ..	C. Clemow, Stratford	1 332	275·5	362	7,917·5	487·33
Penrose Brooklet ..	Ditto ..	1 341	275·5	305	6,875·2	420·74
Penrose Crystal ..	,, ..	2 7	276·2	305	7,159·7	382·56
Edgecote Wildflower	A. L. Clark, Cambridge	1 355	275·5	310	6,216·9	315·79
Illawarra Nancy ..	Mrs. R. Irvine, Waihi	2 24	277·9	255	5,480·4	315·04
Senior Two-year-old.						
Ashvale Dreaming Stella	J. and G. W. Dobson, Lepperton	2 350	310·5	365	12,689·1	815·73
Peveril Queen ..	A. Hudson, Levin	2 331	308·6	365	12,253·3	570·01
Peveril Jolly ..	Ditto ..	2 241	299·6	365	9,854·9	524·12
Peveril Faith ..	,, ..	2 322	307·7	365	9,767·8	491·57
Blythe Mabel ..	T. Anstis, Opotiki	2 305	306·0	365	8,657·7	438·39
Three-year-old.						
Hatcliffe Zinnia ..	P. A. Anderson, Levin	3 361	348·1	365	14,588·0	704·25
Tararua Desert Flower	Ditto ..	3 352	347·2	365	11,927·1	671·64
Peveril Alma ..	A. Hudson, Levin	3 125	324·5	365	11,130·7	601·68
Hampton Silver Leaf	A. M. Bell, Otorohanga	3 253	337·3	365	10,900·1	544·98
Wairere's Marina ..	A. Faull and Sons, Stratford	3 25	314·5	365	9,488·9	543·28
Four-year-old.						
Craigalea Judy ..	W. J. Robertson, Eltham	4 338	382·3	365	12,137·8	785·21
Breffni Morning Light	Mrs. J. R. Sheehan, Papakura	4 325	381·0	365	12,443·7	750·78
Someview Lynette ..	Ditto ..	4 364	384·9	364	11,350·6	594·63
Glenrose Gladys ..	Misses W. and C. Wright, Redvale	4 86	357·1	362	8,992·6	562·90
Standards Goldlink ..	A. Hazelton, Waihou	4 364	384·9	357	9,413·9	516·55
Woodlands Sweetheart	W. C. Mears, Ngarua	4 288	377·3	365	8,832·0	503·51
Strandon Crissie ..	J. F. Young, jun., Inglewood	4 328	381·3	290	9,415·5	500·00
Greenwoods Viola ..	J. and F. O'Grady, Waihou	4 303	378·8	365	6,922·8	390·57
Craigknoll Cupid ..	R. D. Thomson, Tokoroa	4 29	351·4	257	6,570·3	351·54
Mature.						
Meon Kit	J. and G. W. Dobson, Lepperton ..	6 325	385·0	365	11,587·1	694·46
Strandon's Bo-peep	J. F. Young, jun., Inglewood	5 357	385·0	365	12,127·0	685·79
Craigalea Audrey ..	W. J. Robertson, Eltham	5 4	385·0	365	11,598·3	667·32
Craigalea Lovey ..	Ditto ..	6 361	385·0	365	9,047·9	619·74
Ujiji Dark Queen ..	R. D. Thomson, Tokoroa	5 277	385·0	365	8,846·1	616·76
YEARLY DIVISION—*continued.*						
Jerseys—*continued.*						
Mature—continued.		Yrs. dys	lb.		lb.	lb.
Peveril Bonny Belle ..	A. Hudson, Levin	5 274	385·0	365	10,869·1	596·89
Linburn Sunflower ..	Mrs. R. Comber, Tauranga	5 87	385·0	365	9,090·3	571·49
Netherby Napoleonette	A. G. Green, Nelson	7 15	385·0	365	11,993·4	570·46
Jersey Farm Sybil ..	W. H. Ridge, Norsewood	8 288	385·0	326	8,573·5	490·18
Silodale Graceful ..	A. G. Somervell, Takapau	7 272	385·0	343	8,298·1	458·20
Friesian.						
Senior Two-year-old.						
Bushlea Flora ..	Smart and Son, Tikorangi	2 204	295·9	365	13,737·5	531·70
Milking Shorthorn.						
Senior Three-year-old.						
Hauruia Mater 5th ..	J. W. Graham, Christchurch	3 304	342·4	365	11,545·2	506·74
Senior Four-year-old.						
Bankhead Brunswick 19th	Sam Smith, Springbank R.M.	4 269	375·4	365	14,010·2	529·05
Mature.						
Hauruia Polly 3rd ..	A. L. Souter and Sons, Waerenga	8 354	385·0	365	12,657·9	574·91
SECOND CLASS.						
Jersey.						
Junior Two-year-old.						
Ku Ku Princess Royal	R. L. Horn, Ohau	1 330	275·5	365	9,091·2	421·82
Three-year-old.						
Oakford Lady ..	J. W. Humphrey, Gordonton	3 ,,	321·9	365	8,013·9	358·83
305-DAY DIVISION.						
Jersey.						
Junior Two-year-old.						
Homestall Fairy Star	Mrs. E. C. Moore, Te Rapa, Hamilton	1 348	250·5	305	6,282·2	344·50
Hedges Ailsa ..	A. K. Cotterill, Te Kahiha, Havelock North	2 42	254·7	305	5,553·2	293·81
Senior Two-year-old.						
*Ashvale Dreaming Stella	J. and G. W. Dobson, Lep-	2 350	285·5	305	11,317·8	711·51
Three-year-old.						
Miss Eminent ..	L. D. Adams, Sheffield	3 359	322·9	305	10,563·3	478·79
Otterburn Sunray ..	W. C. Mears, Ngarua	3 360	323·0	305	7,962·6	407·74
Otterburn Model ..	Ditto ..	3 312	318·2	303	7,493·4	371·30
Mature.						
*Meon Kit	J. and G. W. Dobson, Lepperton	6 325	360·0	305	10,482·5	621·15
Design Sybil Seashell	E. R. Bull, Manutuke	6 331	360·0	305	8,599·3	465·46
White Rock Golden Gem	A. G. Green, Ngatimoti, Nelson	5 111	360·0	303	7,834·5	376·49
Milking Shorthorn.						
Mature.						
Wilford Grove Jean	Miss R. Arnold, Nelson	5 3	360·0	305	11,489·5	469·53

* This cow also qualified for a certificate under the 365-day Test Division.

Certified Government Stock Seeds.

Ordering and Distribution.

J. H. Claridge, Seed Certification Officer, Wellington.

SUPPLIES of superior seeds of each of the main pasture plants are being produced annually in limited quantities by the Department of Agriculture. These seeds are the tangible result of years of breeding and selection work on the part of specially trained research workers, and have been proved to be even superior to the best certified lines previously available. Every effort has been made, both in the original selection and in the bulking up to marketable quantities of the produce, to ensure that the material available for distribution retains that high quality for which it was originally selected.

The seed available for distribution is designated "Certified Government Stock Seed," and is actually the highest grade of seed (from a type aspect) available to the farmer.

In view of the limited supplies of seed produced from year to year the Department has found it necessary to introduce fairly strict conditions in regard to the distribution of the available seed. As a *pro rata* delivery is often necessitated it is the desire of the Department that farmers should know before finally preparing their land and committing themselves to the sowing of Government stock seed just what quantity is being allotted to them.

Ordering and Distribution.

The following conditions have been drawn up in regard to the ordering and distribution of certified Government stock seed in ensuing seasons, when it is expected that supplies of the following seeds will be available:—

Perennial rye-grass	White clover.
Italian rye-grass	Montgomery red clover.

1. Orders will be received only from mercantile firms, who may place orders on their own behalf or on behalf of clients.

2. Orders should be placed with the Director of the Fields Division, Department of Agriculture, Wellington.

3. All orders to hand at the 31st August of any one year will receive equal consideration in the distribution of any seed available at that date.

4. If necessitated by the number of orders received, the Department reserves the right to make a *pro rata* allocation of seed.

5. The Department, immediately after the 31st August in each year, will advise merchants of the total quantity of seed allocated in respect of the order or orders placed by them, together with the particulars and price of the seed.

6. Such advice is subject to confirmation by the merchant concerned of acceptance of the seed allocated.

7. Delivery of seed will be made immediately after 30th September of any one year or any later date advised by the merchant, but not later than 30th November following.

8. In the event of a surplus of seed after the filling of orders received up to 31st August, such seed will be utilized to fill, in order of receipt, orders received subsequent to that date.

Note.—The production and distribution of certified Government stock cocksfoot-seed is undertaken by the Canterbury Agricultural College, Lincoln, to whom intending purchasers are referred for particulars regarding supply.

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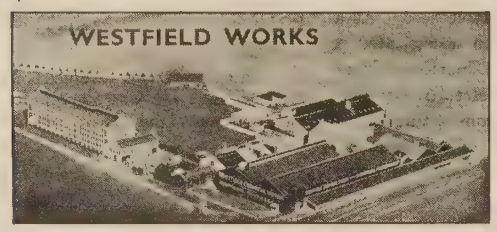
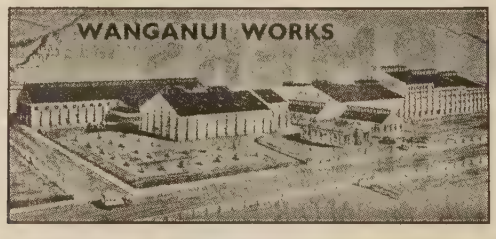


IN THE NORTH ISLAND

"WESTFIELD"
BRAND



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Seed Certification.

Summary of Operations of Season 1937-38.

J. H. Claridge, Seed Certification Officer, Fields Division, Wellington.

THIS report is in the nature of a summary of the activities of the Department of Agriculture during the 1937–38 season in connection with the official scheme of seed certification. The growth of the scheme is not now so phenomenal as has been the case in earlier years, but there is revealed a stability in the past few seasons which can be taken as an indication of the fact that the demand for certified seeds is permanent. For all kinds of seeds receiving recognition under the certification scheme there is a ready market.

The scheme has undergone no amendments of note during the past twelve months, although an extension in the case of perennial rye-grass, cocksfoot, and white clover has been the certification of seeds in a "pedigree" class. The primary qualification for certification in this class is that the area has been sown down with certified "Government stock" seed, being seed raised from specially selected nucleus lines.

Government Stock Seeds.

The relatively small quantity of seed it is possible to produce still remains the limiting factor in the development of the use of seeds of specially selected strains. The inquiries received during 1938 for certified Government stock seeds far exceeded the quantity of seed produced. Of perennial rye-grass 1,035 bushels, and of Montgomery red clover 366 lb., were available to meet the demand, but of white clover no seed whatever was forthcoming. In addition, the Canterbury Agricultural College distributed 3,000 lb. of certified Government stock cocksfoot seed.

Contracts have been arranged for further areas of all these seeds, while the inclusion of an area of Italian rye-grass to this list is a further step towards the improvement in type of New Zealand pasture plants.

Perennial Rye-grass.

A feature of the 1937–38 programme was the inclusion, for the first time, of certified "pedigree" seed, the produce of areas sown out with certified Government stock seed. More than 5,000 bushels of seed qualified in this class, while increases were shown in each of the other grades of perennial rye-grass seed. In all, 190,000 bushels of seed were finally sealed and tagged as of certification standard. Nearly half this quantity received recognition as certified "commercial," an indication of the value of this class in extending the range of certification without in any way lowering the quality.

Better germinations have been experienced with seed from the 1937–38 harvest, so that the very acute shortage which was the outcome of a combination of low yield and low germination during the previous season has, to some extent, been allayed. There is still evidence of a short-supply on the market, however.

Cocksfoot.

The introduction in the season under review of the "pedigree" class denotes a progression in the certification of cocksfoot-seed. The 8,000 lb. of seed certified in this class is of the strain usually referred to as "C. 23," which is produced at the Canterbury Agricultural College. A minor qualification for this seed is the very high degree of freedom from rye-grass seed which is demanded of the machine-dressed product.

Following the very unfavourable season experienced on Banks Peninsula during 1936–37, a return to more normal conditions in 1937–38 has resulted in a considerable increase in the quantity of cocksfoot-seed certified. The average yield per acre over all areas was 124 lb., but an indication of the possibilities in cocksfoot-seed production may be gained from the figures of the three pedigree seed-producing areas, where 27 acres averaged the high yield of 289 lb. per acre.

White Clover.

As with perennial rye-grass and cocksfoot, certified pedigree white-clover seed is now also available. The quantity produced during 1937–38 was small, the half-ton of seed certified being the produce of one area of 16 acres. The quantity of seed certified in the "mother" and

North Island Lambing Estimate.

From information supplied by Inspectors of Stock in the various districts, the average rate of lambing for the current season in the North Island is estimated at 80·11 per cent., compared with 86·52 per cent. in 1937. With 10,735,829 breeding-ewes in the North Island as shown in the 1938 sheep returns, the number of lambs this season is estimated at 8,600,625. South Island and Dominion returns will be given in the next month's issue of the *Journal*.

SOMETHING SPECIAL IN THE WAIKATO.

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"permanent pasture" classes has been well maintained, but it should be remembered that the figures for the 1936–37 season probably included a proportion of seed held over from an earlier harvest and only brought under certification through the provisions of the revised procedure.

The importance of the northern part of the Canterbury Province as a white-clover-producing district is exemplified from the fact that nearly two-thirds of the total quantity of seed submitted for certification came from this area.

Brown-top.

No change is recorded in the certification of brown-top seed. The reduction in total output is purely seasonal, this figure fluctuating from year to year with the general conditions prevailing.

Red Clover.

Montgomery red clover has been in such high demand this year that the importation of English-grown seed has probably exceeded that of the previous highest season—this in spite of the fact that the production of certified New Zealand seed showed an increase of 60 per cent. during the 1937–38 season. Seasonal conditions for the harvesting of this seed, while better than those experienced during 1936–37, were by no means favourable. In the meantime, the number of areas eligible for certification is extending, and it is hoped that with more suitable conditions the supply of New-Zealand-grown seed might more nearly approach the demand.

Italian Rye-grass.

The harvesting of Italian rye-grass seed under a scheme of seed certification is extending, although at a slower rate than the demand for certified seed. As a result, the market is not yet in a position where it can meet all requirements. The performance of this seed in Australia is such as to give every encouragement to the idea of a strong export trade when production can be increased.

An average yield of more than 23 bushels per acre was obtained, an improvement of 3⅛ bushels on the figure for the 1936–37 season.

Phalaris Tuberosa.

The main factor mitigating against the development of the certification of *Phalaris tuberosa* appears to be the absence of reliability in regard to the expectation of a satisfactory yield. Apart from one high yield obtained in the 1935–36 season, and another in the season under review, yields have been uniformly low, and it cannot be expected that under such conditions any progress will be made.

Seed Wheat.

Reduced acreages entered for seed-wheat certification were experienced during the 1937–38 season, 5,290 acres having been inspected as compared with 7,920 in the previous season. This reduction, it is considered, is attributable largely to the lower premium offered to the producer for certified seed wheat, and with a return to the original premium the position should be rectified.

Cross 7 still figures high in the returns, 50 per cent. of the acreage inspected and 45 per cent. of the seed finally sealed

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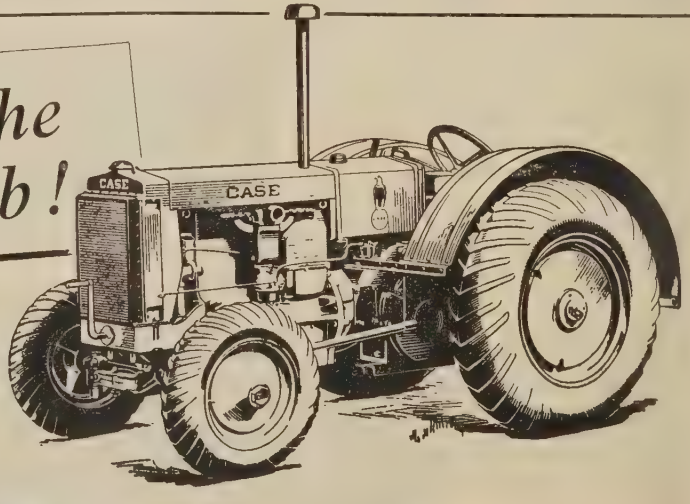

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being represented by this variety. It is probable that there is a twofold explanation of this—firstly, the popularity of the variety, and, secondly, the necessity of some careful system of control to prevent a rapid deterioration through spread of loose-smut infection. The figures indicate in regard to the latter that the certification scheme offers a very satisfactory means of supervision.

A point of interest is the introduction to commence through certification of two new varieties, Tainui and Taiaroa.

Seed Potatoes.

Further increases are recorded in the scope of seed-potato certification during the 1937–38 season. Rejections because of the presence of virus disease were the lowest on record, only 7½ per cent. of the crops failing to qualify for certification in this respect. Rejections because of the presence of foreign varieties again approximated 3 per cent. It is important to note, in this connection, that the admixture of varieties causing most of these rejections could be traced to the presence of self-sown potatoes in the field and not to impurities in the lines of tubers certified in the previous season.

While there has been a reduction in the quantity of tubers of the two main varieties—Aucklander Short Top and Dakota—inspected after grading, increases in the quantities of the next seven varieties on the list of importance have resulted in a total increase of more than 300 tons of inspected and tagged seed tubers.

Brassica Crops.

An increased acreage of Giant type rape was harvested for seed under certification. This, combined with an improved yield (8 cwt. per acre), has given a much greater quantity of seed available for distribution. The supply is still unequal to the demand, however, and efforts are now being made to increase the production of this seed.

General.

The accompanying table gives the quantities of the various seeds certified since the inception of seed certification in 1927, and also shows the estimated value of the seed certified in each season. It should be noted that this table includes only seed in a machine-dressed or graded condition, and does not include seed harvested but not submitted for machine-dressing or (in the case of potatoes) tuber inspection.

Persons or firms interested in the complete tabulated results for the season may obtain copies on application to the Director of the Fields Division, Department of Agriculture, Wellington.

Table giving Quantities of each Seed Certified and Estimate of the Total Value of Seed Certified in each Season.

Seed.	Chief Consideration upon which Certification is based.	Quantities of Seed finally certified										
		1927–28	1928–29	1929–30	1930–31	1931–32	1932–33	1933–34	1934–35	1935–36	1936–37	1937–38
Potatoes (tons) ..	Varietal purity, cropping-power, and freedom from virus disease	217	249	511	760	818	938	1,806	1,821	2,845	3,132	3,453
Wheat (bushels) ..	Varietal purity and freedom from loose and stinking smuts	3,840	11,682	16,714	*4,060	*1,283	7,001	6,012	11,110	25,646	47,465	44,158
White clover (lb.)	Age of pasture, 1928–31; type of clover, 1931–38	..	10,595	69,015	67,242	*6,131	33,731	20,337	93,381	56,092	460,930	405,530
Perennial rye grass (bushels)	Genuine perennial type	..	..	17,052	45,982	81,186	245,667	119,019	182,386	270,305	129,495	189,717
Brown-top (lb.) ..	Freedom from red-top (*Agrostis palustris*)	..	..	170,071	171,083	198,343	138,843	118,978	384,588	212,734	371,358	255,981
Cocksfoot (lb.) ..	Type as exemplified in the produce of Akaroa Peninsula	..	..	..	..	171,720	622,765	200,560	715,982	657,319	334,374	691,376
Red clover (lb.) ..	Type conforming to that of English-grown Montgomery red clover	..	..	..	..	1,550	3,763	17,263	32,193	23,620	28,140	45,275
Brassicas (lb.) ..	Varietal purity and freedom from disease	..	..	..	..	..	..	25,515	522	24,503	12,432	34,482
Italian rye-grass (bushels)	A rapid-growing high-producing type, showing recovery after cutting	..	..	..	..	..	..	..	5,121	6,669	12,549	13,632
Phalaris toberosa (lb.)	Freedom from other species ..	..	..	..	..	..	..	..	..	2,701	1,533	4,542
Estimated value of seeds finally certified		£2,070	£4,889	£30,328	£40,048	£57,358	£142,585	£79,018	£154,725	£184,501	£168,845	£200,630

* Reductions accounted for by changes in regulations.

Total estimated value of seed certified (1927–38), £1,064,997.

Pure-breeding of Pigs.

"Acum" (Taranaki), writes: I have a number of pigs which do not seem to thrive, although they have good housing and there is plenty of milk. Do you think it would trace back to the boar? He is from a crossbred Tamworth-Berkshire sow by a Large White boar, and, although a young pig, is not bad to look at.

In reply, the Live-stock Division states that looks are no recommendation. There is only one way to success—breed from purebred stock. A scrub pig such as yours will produce slow-growing, coarse, thriftless pigs, which can yield profit neither to the feeder nor the butcher.

The results of the practice of keeping the worst pigs at home and breeding from them can be seen in the many poor runts that are to be found on far too many farms. A good pig costs no more to feed—even less—than a bad one. The difference is that one will thrive and put on weight consistently from birth, while the other will eat but never finish.

Begin by dosing the pigs with salts; they may be constipated. Follow with cod-liver oil, and introduce a little (about ½ lb.) good concentrated food, such as meat-meal, in their daily ration. Good housing and bedding during the winter is essential. Good conditions will make a poor pig a better pig, but bad conditions will ruin the best pigs.

❖ ❖ ❖

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It is a well-established fact (and one that has actually been proved by experienced graziers all over New Zealand) that protection is assured against BLOOD-SUCKING, STOMACH, INTESTINAL HAIR WORMS, and TAPE WORMS—and risk of infection reduced—by alternately drenching with . . .

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(1 bottle makes 2 gallons of Drench.)

Results of Pig Census.

Pounds of Pig Meat per 100 lb. of Butterfat.

M. J. Scott, Superintendent of the Pig Industry.

THE information supplied by farmers all over New Zealand during the year ended 31st May, 1938, through the pig census, has been subjected to analysis by the staff of the experimental section of the Fields Division.

The analysis has necessitated the examination and consideration of nearly two thousand pages of information, and the condensing of the facts into a few figures. In so far as the final results have been obtained from the returns of actual producers of commercial pigs on genuine dairy-farms, they are beyond the pale of mere opinion, and in this respect they are different from any explanation of them that may be made in these notes.

Explanations may easily be misleading and are put forward in the hope that, where necessary, they will be corrected by others who may view the facts from a different standpoint. In this way it should be possible to arrive at something like an explanation which would be of immediate benefit to the whole industry.

Five Groups.

Out of the 500 farms from which information was obtained only 182 have been used in these summaries. The remainder had to be rejected, usually on account of incompleteness of the data supplied. This, it is hoped, will be easily remedied in future.

In the analysis the farms have been arranged into five groups according to the amount of pig-meat produced per 100 lb. of butterfat :—

	Farms.
A. Under 20 lb. ..	16
B. 21 lb. to 40 lb.	72
C. 41 lb. to 60 lb.	60
D. 61 lb. to 80 lb.	26
E. 81 lb. and over	8

In spite of the dreariness of tabular material, it is necessary to use a table to compare these groups.

This table displays a number of points :—

(1) The low returns tend to be associated with big herds of cows and relatively few sows. The high returns with few cows and many sows. Cows per sow fall from 17 to 5 as the returns improve.

(2) Production per sow increases from a quarter to half a ton of pig-meat as the returns improve.

(3) The number of pigs born, sold, and died improve as returns improve.

Table 1.

Group	A.	B.	C.	D.	E.
Number of farms	16	72	60	26	8
Averages of—					
Pounds pig-meat per 100 lb. butterfat	16·5	31·1	47·8	65·6	100·7
Number of cows kept	58	62	53	47	18
Number of sows	3·4	4·4	4·9	5·9	3·6
Cows per sow	17·0	14·0	10·7	8·2	5·0
Production per sow—					
Pounds of pig-meat produced	569	877	1,018	1,052	1,012
Number of pigs—					
Born	11·1	13·9	13·1	13·4	14·0
Bought	1·5	1·9	1·4	2·2	0·9
Sold	8·3	10·5	11·3	12·7	13·4
Died	3·5	3·5	2·7	2·3	1·4
Pounds feed used to produce 100 lb. of pig-meat—					
Total (lb.)	1,680	927	636	495	439
As milk (gallons)	1,512	805	524	380	248
Meal (lb.)	56	35	39	49	51
Other (lb.)	112	87	73	66	140
Weight of pigs sold	69	84	90	83	76
Earning value of 1 gallon of milk*	0·31d.	0·65d.	1·00d.	1·33d.	1·96d.

*This has been arrived at by taking pig-meat at 6d. per lb., subtracting the cost of feed used to produce it (meal at £14 per ton and other at £2 10s. per ton), and crediting the remainder to the gallons of milk used. No allowance has been made for labour or other charges.

Importance of Management.

(4) Feed used to produce 100 lb. of pig-meat is the most remarkable feature in the table. The "totals" line shows a change from 1,680 lb. to 439 lb. for the production of 100 lb. of pig-meat as the returns improve. The amount of meal used is apparently a matter of indifference, as is the amount of other feed. The reasons for efficiency in the use of feed are not to be looked for in the amounts of grain or meal or in the amount of other feed used or in the kind of pigs sold, so much as they are in the care and attention given by the man who feeds the pigs.

Where pigs are fed regularly with enough feed to keep them growing naturally, where feed is clean and free from harmful organisms, where internal parasites are absent, thus allowing pigs to be healthy, and where houses are warm and comfortable—in those circumstances pigs use feed efficiently. Efficient use of feed is the chief cause of good returns, cows per sow and production per sow appear to be an effect not a cause.

This explanation will be most unpopular with many who look upon a cheap grain-supply as the chief source of profits. This will be dealt with in next month's issue. As an incentive to exercising greater care in the use of feed, cheap grain, together with good housing and conveniences, plays a considerable part in getting good returns. Of the eight farms obtaining good returns, six are in Canterbury and two in the Taranaki area, but they might be equally expected in any other province. In all cases meal has been costed at £14 per ton. Reducing its cost to £6, the approximate Canterbury price, improves the return per gallon of milk to approximately 2·14d. per gallon in Group E. At a later date it is hoped to obtain a more complete story of some of these high-producing pig-farms.

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Factors in Successful Farming.

(9) Live-stock "Barometers."

W. N. Paton, Senior Investigational Officer, Accounts Division.

THE title "Live-stock 'Barometers'" may appear unusual, but it has been specially selected to convey the idea that live-stock can be used to measure the effects of farm-management practice. A barometer is of little use without a scale by which it may be read, and hence, in employing live-stock as farming barometers, the "aids and measures" referred to in the previous article have to be applied. By such means live-stock farming can be rendered more intelligible and more efficient.

Uniformity of Stock.

Reference to the need for uniformity in live-stock has been made in previous articles. A further reason for the advisability of uniformity becomes apparent in considering the use of live-stock as "barometers." Animals of divergent types react to a common set of conditions somewhat differently, particularly where the range of divergence is considerable. Instances are occasionally met where a herd of cows is so mixed in type, size, breed, &c., that they can be described aptly as a "Noah's Ark" collection. What chance has a farmer with such a herd of utilizing the total herd-production as a sufficiently sensitive indicator of varying conditions or varied management?

Considerable favourable or adverse conditions will, of course, show up in variation in total production, but for successful live-stock farming finer measures are desirable. There are times and cases where production with part of a herd may be up while the rest may be down, and on such occasions total production may show little change. Unthrifty cows showing signs of more or less chronic digestive trouble may be the sole cause of feed taint in the herd milk or cream, or, where the class of feed does tend to affect all cows, taint will be most marked for unthrifty individuals. Again, some cows will be found to be notorious feeders of weeds, &c., giving rise to taint. All such cows should be eliminated from the herd in order that management against ordinary feed taints may be effective.

From this will be seen one reason why state of health and constitution need to be uniform. Unthrifty individuals are potential disease-spreaders, as they are the first to give trouble. The more uniformity there is within the herd or flock on all counts the more uniformly will all individuals react to conditions of all kinds. Not only is each a barometer in itself, but each barometer conforms to a common standard. Where high uniformity pertains there is not the same need to check the production of each individual, except for culling and breeding purposes.

Dominion Sheep Statistics.

THE number of sheep (including lambs) in the Dominion on the 30th April, 1938, totalled 32,378,774 in land districts as under:—

	Ewes.	All Sheep.
North Auckland ..	703,867	1,170,264
Auckland	1,499,095	2,298,317
Gisborne	1,329,627	2,424,514
Hawke's Bay	2,630,797	4,270,800
Taranaki	480,338	788,396
Wellington	4,135,873	6,850,612
Nelson	259,071	461,437
Marlborough	629,054	1,173,217
Westland	62,603	90,861
Canterbury	3,726,314	6,147,589
Otago	2,325,385	3,978,117
Southland	1,881,642	2,724,650
Dominion Totals ..	19,663,866	32,378,774

The Use of Aids and Measures.

Aids and measures are invaluable in obtaining and maintaining the necessary degree of uniformity, and in improving the productive capacity of the stock as a whole not only as regards quantity, but also quality of product. In the concluding portion of the previous month's article a list of some of the main measures in common use was given, together with an indication that scope existed for additional measures being devised and adopted. Aids of this sort have long been in extensive use in dairy-farming, but it is only in more recent years that appreciable work of this sort has been in evidence in sheep-farming.

A great deal of progress has also been made in recent years in the pig industry. Egg-laying competitions, progeny testing, and trap-nest testing have long been in use among poultry-breeders. With the exception of bee-keeping, where a difficult problem exists, the present position in the application of productive measures to live-stock in New Zealand is indeed encouraging. However, there is still considerable scope for a better recognition and more extensive utilization of such methods by a large number of farmers.

Value to be Obtained.

The value to be obtained from the use of aids and measures lies in the extent of application of the testing results. One only needs to take the case of the herd-testing movement. In the early years of the work not enough was known of the many and varied uses to which herd-testing records could be applied, nor was the work extensive enough to show much effect in the Dominion average of production of butterfat per cow, but over the whole period of close on thirty years tremendous improvement has been brought about. Testing, in itself, is no panacea for the troubles of the average dairy-farmer; it is the application of the results that counts.

Similarly, with all classes of farming, and particularly live-stock farming, the aim should be to apply aids and measures to as many problems as possible and put the resultant information to effective use. Production records are an invaluable indicator of farm-management practice throughout the whole exploitation chain—namely, soil, pasture and forage crops, live-stock, and live-stock products, especially where uniformity of live-stock exists.

Appraisal Aids and Indicators.

Appraisal methods are useful in breeding-work and in detecting sickness, disease, malnutrition, &c., in live-stock, and form a good supplement to production-testing measures. Neither one nor the other should be depended on solely; it is the two in combination that are most effective. Various phenomena serve as valuable indicators of when things are going right or wrong, and therefore should be closely observed at all times. It is by developing a faculty for noticing and understanding as much as possible of the observable phenomena that a farmer is better enabled to grapple

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with his problems and devise ways and means of tracing them to their source and of eliminating them.

It must be remembered that often the effect of a cause is not noticeable in any recognizable form until the cause has been operating for quite a lengthy period. Biological functioning is extremely complex, and real appreciation of what is involved can be gleaned somewhat from the statement that for every effect there is a cause, and that every cause is the effect of some other cause, and so on almost *ad infinitum*. We plug one hole, only to find a leak somewhere else, and thus one cannot afford to take the short view at any time.

Farming a Technical Vocation.

Modern farming under high-level-productive exploitation methods is a technical business, and hence calls for scientific treatment in all its ramifications. It behoves all farmers, therefore, to be methodical in their work and apply the most effective methods at their disposal. Economic efficiency should be every farmer's watchword, and in this direction the most potent aids are observation and recording. Properly put to use, these aids are of outstanding educational value and service. Linking up with these aspects, next month's article will deal with "farming efficiency and recording."

❖ ❖ ❖

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Calcium Gluconate.

FULL details for the use of glucose in connection with sheep and lambs are asked for by G. H. E. (Hastings), and the Live-stock Division states in reply that it is not clear from your question as to the information you require. Glucose by itself is not used in any general way so far as sheep and lambs are concerned. There is a preparation known as calcium gluconate which is used for the treatment of milk-fever in ewes at lambing-time. Although milk-fever in ewes is not rare in the South Island, it is not very generally recognized in the North Island, where the general feed conditions are markedly different from those obtaining in parts of the South Island.

The solution of calcium gluconate which has been used with success in the treatment of milk-fever in ewes is prepared by mixing 20 parts of calcium gluconate, by weight, in a 5-per-cent. solution of boracic acid in water. Five parts of boracic acid, by weight, are dissolved in 100 parts, by weight, of water. Dissolve the boracic acid in boiling-water and then add the calcium gluconate. The boracic acid is added to prevent the gluconate crystallizing out on cooling.

The solution as prepared is injected subcutaneously in the region of the brisket, the dose given being from 3 oz. to 4 oz. of the solution per sheep. The syringe and needles used should be sterilized before use. Milk-fever in ewes has also been successfully treated by air inflation of the udder on similar lines to that carried out on the dairy cow affected with the same disease.

With the excessive amount of wet weather experienced in Hawke's Bay during the year numerous inquiries have been made regarding the best method for mole draining. To comply with these requests field-days have been arranged to demonstrate the most economical system. These demonstrations have been well attended, and no doubt there are thousands of acres of easy country which can be drained and put to better use, particularly during the winter and early spring months.

Citrus Pests: (5) Scale Insects.

W. Cottier, Plant Diseases Division, Plant Research Bureau.

THE scale insects on citrus trees and fruit may be divided into two groups :—

(1) *Shielded Scales.*—In this group the adult insect is very soft, and lies beneath a scale covering which is separate from the live insect, but which has been produced by it. The covering shield contains the cast skins of previous moults. Examples : (*a*) The red scale (*Aonidiella aurantii* Mask.) ; (*b*) the circular black scale (*Chrysomphalus rossi* Mask.).

(2) *Unshielded Scales.*—In this class there is no separated shield covering the insect. The exposed portion of the scale insect is heavily thickened and hardened, and may be further protected by a covering of wax. Examples : (*a*) The olive scale (*Saissetia oleae* Bern.) ; (*b*) the hemispherical scale (*Saissetia coffeae* Wlk.) ; (*c*) the white wax scale (*Ceroplastes sinensis* Del. G.) ; (*d*) the cottony cushion scale (*Icerya purchasi* (Mask.).

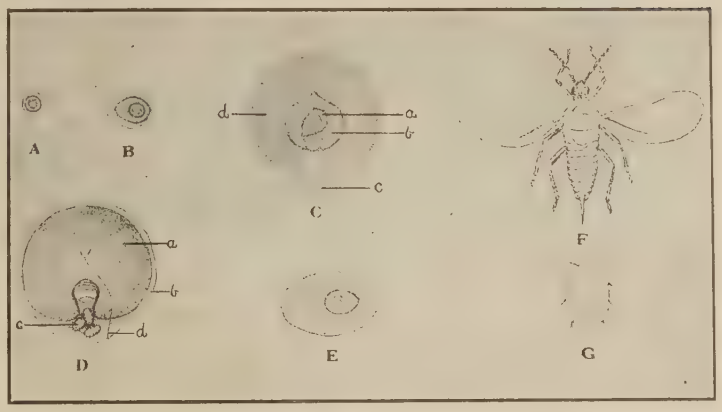


Fig. 1.—Stages of the Red Scale.

A, Scale covering forming over newly-settled "crawler." B, Female scale of second stage—the skin cast by the previous moult can plainly be seen. C, Adult female scale: (a) Skin cast after first moult; (b) skin cast after second moult; (c) parchment-like covering of rest of scale; (d) the underlying insect showing through the semi-transparent scale. D, An adult female scale turned ower: (a) The undersurface of the actual scale insect; (b) the covering scale; (c) newly-produced "crawlers"; (d) thread-like mouth parts. E, Mature male scale. F, Adult male scale insect. G, Newly-produced "crawler."

[All magnified and all del. by W. Cottier, with the exception of F, which is after Miller.

(1) Shielded Scales.

The scale covering of this group is diagrammatically shown in Fig. 1 (A) to (E). In passing from the young stage to the adult the female insect moults twice—as it becomes too big for one skin this is discarded and a second produced which is capable of more expansion. These two cast skins are incorporated in the scale covering as shown in Fig. 1 (C), where (A) is the skin cast when the insect passed from the youngest stage to the middle stage of growth, and (B) is the skin cast when the insect passed from the middle stage to the adult.

The remainder of the scale covering (C) is made up of thin, tough, parchment-like material. The insect itself lies beneath this scale, and is not in any way attached to it. The shield of the male (Fig. 1 (E)), contains only one cast skin, and thus can be readily differentiated from that of the adult female. Apart from this, the male scale is usually smaller than that of the adult female, and may be elongated.

Generalized Life-history.

In the shielded scales, according to the species concerned, reproduction is brought about by means of eggs or living young. These are produced beneath the scale covering of the adult female, the eggs subsequently hatching into "crawlers." The "crawlers" (Fig. 1 (G)), whether hatched from eggs or produced as living young, remain under the scale covering for a short period (Fig. 1 (D)). In this stage the insect is more or less oval in outline, minute, and flattened, and is provided with antennæ or "feelers" and legs.

These young forms emerge from beneath the scale, and after wandering about on the host for a period settle in a suitable place, insert their mouth parts, and begin to feed. As soon as feeding begins the insect starts to secrete its covering, which at first is very small (Fig. 1 (A)). After a time the first moult takes place, and the cast skin is incorporated in the scale covering of the second stage (Fig. 1 (B)). During this change the insect loses both legs and antennæ, and therefore is incapable of further locomotion, so that the position selected by the larva is the one occupied during the whole of the subsequent life of the female.

If the individual be a female, after a further period the skin is moulted a second time, and the insect is now adult (Fig. 1 (C)). The adult female itself is flattened, and is more or less peg-top shaped, but in some species the sides of the body later become distended into lobes, so that the whole form takes on a more or less circular outline (Fig. 1 (C) and (D)).

Development of the Male.

As in the female, the young male, after a period of feeding, moults for the first time, and the legs and antennæ are lost. After another period a second moult takes place, but the cast skin is not incorporated in the scale covering. The male insect under the covering is now entirely different from the female ; it becomes elongated, and the developing legs, eyes, antennæ, &c., become plainly visible.

After a third and final moult the insect becomes adult, and after resting for a while emerges from beneath the scale. The adult male (Fig. 1 (F)) is provided with a single pair of wings and is without functional mouth parts, so that no food is taken. Apparently, the sole purpose of this stage is to fertilize the female.

Methods of Feeding.

All scale insects feed by inserting their long needle or thread-like mouth parts (Fig. 1 (D)) into the plant tissue and sucking up the sap through them.

Dispersion of Scale Insects.

Wind is the most important natural factor in the carriage of scale insects from tree to tree about an orchard, and an even dispersion about an infested tree is

greatly facilitated by this means. The most suitable period in the lives of these insects for dispersion by wind is during the small, light, and easily carried "crawler" stage. The quickness of spread is influenced by the length of time these young forms wander about the tree before settling down to feed, and in the case of the red scale, for example, which wanders for a few hours only, dispersion by air currents is slower than in the case of other scales.

The journey over the soil from one tree to another, even if it be only a few feet, is almost an impossible accomplishment for the crawling powers of scale insects, particularly for crawlers, and especially when such obstacles as cultivated ground have to be overcome. It is generally considered that this method of spread from tree to tree is relatively unimportant.

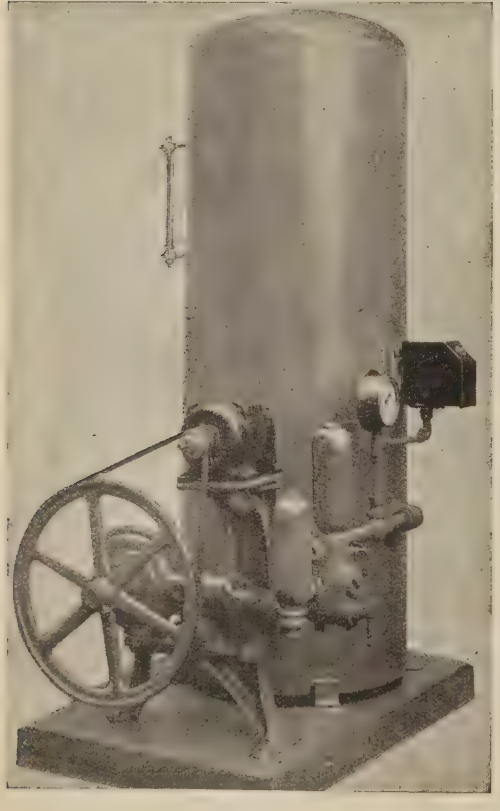
Rain is a dispersion factor, in that it washes larvæ to the lower levels of the tree, and it has been stated that the larvæ of some species can be carried by the wind in rain drops.

Other factors in dispersion are transportation of infested plants and fruits, carriage through the movements of man, animals, implements, and possibly birds about the orchard, and also through the agency of utensils that have held infested material.

Fig. 2.—Red scale on (left) lemon fruits; (upper right) foliage; (lower right) wood. [*H. Drake, photos.*

The Red Scale.

The red scale (*Aonidiella aurantii* Mask.) (Fig. 2), receives its name from its colour. The female scale is circular



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and almost flat, being slightly raised in the centre to form a tiny ring or "boss" (Fig. 1 (C)). The colour of the two moulted skins incorporated in the scale covering is yellowish-brown to reddish-brown, the rest of the scale being a light greyish colour.

Because of the fact that the parchment-like texture of the scale is more or less transparent, however, the colour of the whole adult female scale is usually yellowish-brown or reddish-brown, the colour being due to the scale insect beneath. When the adult female is young and not yet filling the space beneath the scale, the grey colour of the outer parts of the covering can be clearly seen. The insect beneath the scale, when first adult, is longer than it is wide, but later it becomes larger and almost circular in outline (Fig. 1 (C) and (D)).

The diameter of the adult female scale is between 1½ mm. and 2 mm. The adult male scale is much smaller than that of the adult female, and is elongated. The tiny elevation or "boss" is placed towards one end (Fig. 1 (E)). The colour of the scale is also considerably lighter than that of the adult female scale.

Life-history.

The young of this insect are born living as minute oval, flattened, yellow crawlers (Fig. 1 (G)). According to various authors, the number of young produced by one female varies from approximately fifty-five to three hundred, the variation apparently being due to climate, the more tropical the region the larger the number of young produced. The "crawlers" move about for only a comparatively short time after they leave the parent scale covering. It is said that they have been observed to settle in as short a time as thirty minutes, but that the majority will be settled in under ten hours.

To our knowledge no work has yet been done on the length of the different larval stages in New Zealand. Miller (1935) stated that development from larva to maturity occupies from two to two and a half months, presumably in the case of the female insect. According to Summerville (1934), in Queensland the life-cycle occupies a little less than two months on the average. The same author stated that the young from each female are commonly found to emerge over a period of one or two months.

In New Zealand reproduction and the life-cycle generally progress all the year round, although at a greatly reduced rate during the winter. No work has been carried out on the number of generations per year in New Zealand, but it would appear to be most probably three or perhaps in some years four.

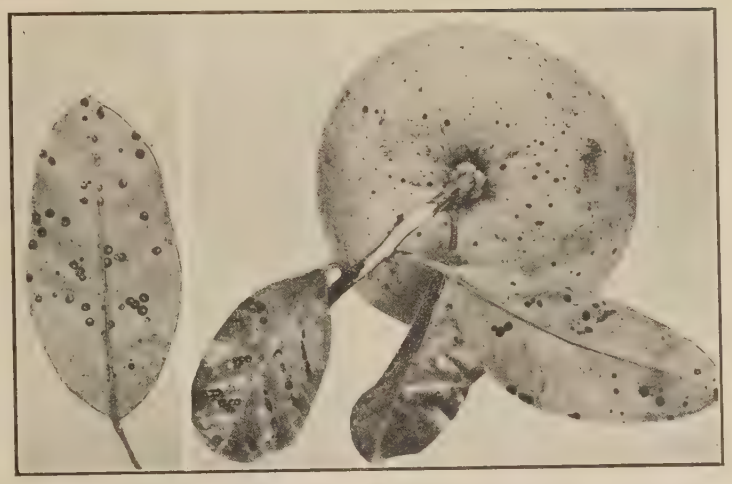

Fig. 3.—Circular black scale on foliage and fruit of Poorman orange.
[*H. Drake, photo.*

Habits.

The red scale attacks all aerial portions of the tree—namely, fruit, leaves, and wood. It seems to prefer living in positions exposed to sunshine rather than in shaded localities. On trees in heavy foliage the most dense populations of scale are to be found on fruit, leaves, and twigs, but in more open trees the wood is often severely infested. The pest does not thrive on a vigorously growing tree with a free flow of sap as it will on a sickly and weakened tree, and it prefers hardened growth to soft and supple parts. It may be for this reason that lemon fruits are more liable to infestation than are oranges, although the latter are also commonly infested. It will breed on picked fruit in the shed in the same way as it will on fruits on the tree.

A notable feature about the red scale is the fact that it does not secrete honeydew, and trees infested by this scale only do not become covered with the sooty fungus that normally grows on this secretion.

Hosts and Distribution.

In New Zealand the red scale has been reported so far only on citrus. In other parts of the world, however, it has been recorded as infesting plum, apple, pear, quince, grape, fig, *Euonymus*, rose, palms, coconut, oleander, ivy, banana, and passion-fruit, &c.

This scale is world-wide in its distribution, being found almost wherever citrus trees are grown. It has been recorded from the United States of America, Southern Europe, Palestine, Egypt, South Africa, Ceylon, India, Japan, China, Australia, Argentine, and Cyprus.

It has been in New Zealand for many years. Maskell (1878) reported it as occurring on orange-trees at Governor's Bay, and said that it was also found in fruit-shops in immense numbers upon the oranges and lemons imported from Sydney. In 1887 the same author reported it on orange and lemon trees at Auckland. He said that the insect had been introduced here from Australia, which is often considered its native habitat.

Control.

Work carried out by the Plant Diseases Division has clearly shown that summer spraying oil used at a concentration of 1 part in 33 parts of water will kill more than 90 per cent. of the most difficult stage of the red scale—namely, the mature adult female. This concentration is therefore recommended, and in cases of even moderate infestation it is necessary to apply two oil sprays of this concentration at an interval of two weeks between each spraying. The time of application is important, and in the state of our present knowledge February is considered the best month to carry out control measures.

The pest must be killed while the fruit is still actively growing so that the scales will have flaked off by the time the crop is ready for harvesting. If spraying is carried out too early it may be found that by the autumn the scale has again built up a large population, which requires another oil, but if spraying is carried out in the autumn, experience has shown that although the insects are killed the scales usually remain on the fruit at the time of picking.

Continual Vigilance.

Proper pruning to allow easy penetration of the spray to all parts of the tree is essential to successful work. Correct spraying methods and the application of sufficient material are very important

considerations which are fully discussed later in this series. At this point it is sufficient to say that these aspects are almost as important as the concentration of the oil itself.

During January and February the grower should be continually on the watch for this scale. It is necessary to examine not only the developing fruits, but also the foliage and wood. It may be found that in January and February the fruits, particularly of oranges, still appear clean, but if there is an infestation on the foliage and twigs this is sure to spread by May to the fruits, and it is then too late to clean off the scales satisfactorily with oil sprays.

The Circular Black Scale.

The circular black scale (*Chrysomphalus rossi* (Mask) (Fig. 3) is almost jet black, is circular or almost so, and is pressed more or less flat against the surface of its host. Almost in the centre of the scale there is a small raised "boss," which is usually of a light brownish-grey tinge. The largest scales usually measure about 2 mm. or 3 mm. in diameter, and, unlike the red scale, they are not transparent. The adult male scale is of similar shape to that of the female, but is smaller.

Life-history and Habits.

The young of this scale hatch from eggs laid beneath the scale of the female. Each egg is about 0·15 mm. long, and is dirty white in colour, ornamented with dark reddish-brown patches, these patches being due to colouring matter within the egg. The young larvæ or "crawlers" just after hatching are about as long as the egg, but considerably wider; they are much flattened, and appear yellowish, suffused with dark reddish-brown. The "crawlers" emerge from the parent scale and settle down in a suitable position, where, as in the red scale, they spend the rest of their lives. After settling, the subsequent stages are similar to those of the red scale.

There are no other data available on the life-history of this insect.

The scale infests both upper and lower surfaces of the leaves of its hosts, and in the case of the orange the fruit is also infested. *Elaeagnus japonicus* seems to be a favoured host of this insect, as large numbers can often be found on the foliage of this plant; *Euonymus* is also a common host. Black sooty mould does not seem to be associated with this scale.

Hosts and Distribution.

Among the food plants of this scale are reported citrus, *Euonymus*, *Elaeagnus japonicus*, *Eucalyptus*, orchids, *Nerium oleander*, *Ricinocarpus*, *Xanthorrhea*, and Camellia.

The species was first described from Australia in 1892. It has also been recorded from California, China, Africa, and the Philippines.

Control.

For this scale use summer spraying oil 1 part in 40 parts of water, and where it is troublesome spray in February.

In connection with circular black scale it will often be found that infestation is brought about from an adjoining *Elaeagnus* hedge or some other alternate host which is acting as a reservoir. Unless steps are taken to remove the scale alternate host plants will prove a continual source of trouble.

References.

(1) MILLER, D. (1935): "Garden Pests in New Zealand," p. 40.

(2) SUMMERVILLE, W. A. T. (1934): "Queensland Citrus Scale Insects and their Control," p. 14.

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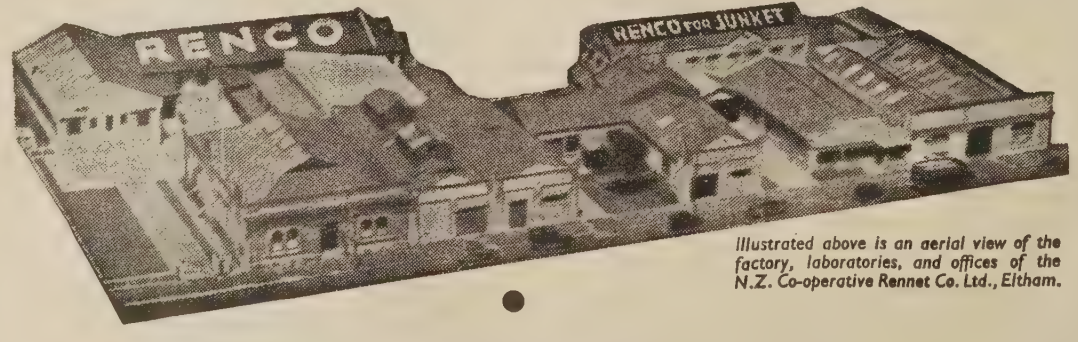

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ELTHAM.

New Director of Horticulture.

Appointment of Mr. W. K. Dallas.

MR. William Kerr Dallas, National Diploma of Horticulture (N.Z.), has been appointed Director of the Horticulture Division of the Department of Agriculture, in succession to the late Mr. J. A. Campbell, whose death occurred recently. Mr. Dallas was formerly Fruit Experimentalist, and for three years was Acting Assistant-Director of the Horticulture Division.

Mr. Dallas is the son of Mr. John Dallas, formerly of "Finegand," Balclutha, and now of Christchurch, and was born at Kaitangata, South Otago. He was educated at the Kaitangata Public School, and later at the Balclutha District High School.

Service in the Department.

In November, 1908, Mr. Dallas joined the staff of the Horticulture Division as a cadet, the Director at that time being the late Mr. T. W. Kirk, F.L.S. In 1912 he was transferred to the Te Kauwhata Horticultural Station, near Auckland, to further his studies in fruit culture and viticulture. Two years later he travelled overseas to study conditions and practices in fruit culture in a number of States in Australia, in Canada, and in the United States of America.

While in California Mr. Dallas assisted Mr. Edmund Clifton, New Zealand Commissioner to the Panama-Pacific International Exposition at San Francisco, with the New Zealand Government's display. At the conclusion of the Exposition he was appointed by Mr. Clifton to take charge of the installation and display of New Zealand products at an exhibition in New York which was organized by the Panama-Pacific Medal Winners' Association. Before returning to New Zealand he visited a number of the more important fruitgrowing areas in the United States.

Post-war Work.

On his return to the Dominion Mr. Dallas enlisted with the Expeditionary Force, and saw active service in France. He received his discharge on his return to New Zealand in 1919, and was appointed Orchard Instructor and stationed in Christchurch. In 1924 he was transferred to Dunedin in charge of the Dunedin-Roxburgh district, and in 1930 he was seconded for duty to the Plant Research Station, where he was under the direction of Dr. G. H. Cunningham, D.Sc.

Mr. W. K. Dallas.
[*Earle Andrew, photo.*

During the past three years Mr. Dallas has been closely associated with the late Mr. J. A. Campbell as Acting Assistant Director of the Horticulture Division.

Interest in Horticulture.

Mr. Dallas has taken an active interest in the activities of the New Zealand Institute of Horticulture, and is a holder of the Institute's diploma. While stationed at Dunedin he acted as secretary of the Otago district committee of the Institute, and is at present a member of the Dominion executive. In addition to his interest in pip and stone fruit culture he is also keenly interested in citrus fruits and their culture, horticulture generally, honey-production, tobacco-culture, and commercial market-gardening pursuits.

Messrs. A. B. Congdon, H. E. Stevens, and F. G. Duncan have been appointed representatives of the producers on the New Zealand Fruit-export Control Board under the Fruit Control Act, 1924.

COMMERCIAL FERTILIZERS

"Commercial Fertilizers and Their Basis of Sale" is the title of a text-book covering the whole field of manures used on a commercial scale in New Zealand, which has been prepared by Mr. J. A. Bruce, late Inspector of Fertilizers to the Department of Agriculture. Nobody connected in any way with the land can afford to be without the information contained in its pages. The price is 3/6, post free, and all you have to do is fill in the coupon.

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(d) Contact points. The contact points are many times the size actually needed, resulting in longer life. They are made of the hardest type Tungsten purchaseable.

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Top-dressing During the Summer Months.

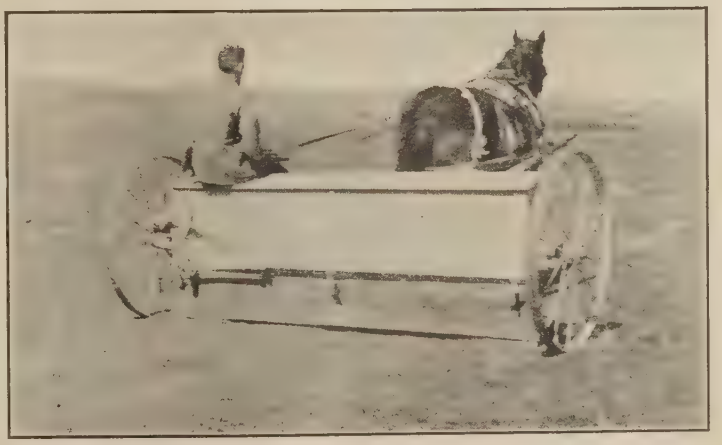
THE best time to apply lime and superphosphate to pasture is in the autumn, so that the winter rains which follow will wash them into the soil. In March, April, and May there is relatively little cropping-work to be done, and, except for dipping, sheep-work does not occupy very much of the farmer's time. Most of the top-dressing in Canterbury is carried out during these three months, and the result is that the lime-works cannot cope with the demand at this time.

It frequently happens that farmers cannot obtain their lime just when they require it, and a month's delay means that the work is often postponed until the next year. When asked by farmers when should one apply lime, my reply is always, "*NOW*," and I add, "Of course, the best time is the autumn."

Spring and summer are busy times on the farm, with lambing, shearing, and cropping, &c., but it is possible to fit in some of the top-dressing programme, and if more of this were done it would be a help to the lime companies and, incidentally, to the advantage of the farmers.

Difficulty of Windy Weather.

One of the difficulties in applying manure in summer is that in windy weather it does not spread evenly. Mr. Edgar Jones, of Waiau, has solved this difficulty by attaching heavy rubber-canvas sheets to his top-dresser. He is farming on stiff clay, downy country, and cannot get a lorry over his paddocks except in summer and early autumn. After the weather breaks in March he cannot cart his lime, and the most suitable period for him to get the work done is therefore from January to March. At this time of the year north-westerly winds are frequent, but with the aid of this attachment to his machine Mr. Jones can carry on even in the very worst of these hot, dry winds.



The top-dresser with the rubber-canvas sheets attached. The manure falls to the ground between the two sheets.

The sheets of rubber-canvas have two metal strips 1 in. wide bolted on the top edge to prevent them from tearing. Sheets are attached one on each side of the box with light wire, and just touch the ground.

The cost of the entire outfit is as follows:—

	£	s.	d.
45 lb. of ½ in. canvas insertion rubber at 2s. per pound ..	4	10	0
Four pieces of metal strip ..	0	13	3
Bolts and nuts to fit strips ..	0	2	3
Total	£5	5	6

Top-dresser Satisfactory.

The top-dresser has been in use for a year and has proved most satisfactory. When there is dew on the ground the sheets cannot be used, as the manure sticks to them. In the absence of wind the sheets are unnecessary, and if there is wind there is no dew.

Mr. Jones carts out his lime and manure by lorry and stacks it on a platform constructed of four petrol-drums and planks, so that there is no lifting up to the top-dresser.

Top-dressing has been most successful on this farm, and during the last eight years 700 tons of lime have been applied to 550 acres. The carrying-capacity is two thousand sheep, which are kept nearly all the year round on 550 acres.

There is a block of 800 acres of hilly country covered with scrub which is used as a run-off for dry sheep. Eight years ago the property carried one thousand one hundred sheep, and wool and poor store lambs were also sold.

Combined with the manuring programme, Mr. Jones has introduced Romney blood into his ewes, and this has considerably improved the weight of wool and the general condition of his stock.

Profitable Results.

The best results from top-dressing have been obtained on the old pastures, where the lime and superphosphate have brought in the clover and produced good swards. Sheep are wintered on hay, as good turnips could not be grown, and store lambs are still sold, as ploughing has been eliminated. The clay is so near the surface that when young grass is put down after turnips or rape it takes three or four years for the sward to thicken up, even though limed and manured.

Mr. Jones is a firm believer in building up the surface fertility for his grass, and for this particular type of soil there is no doubt that he is working on good, sound lines. For him, top-dressing has resulted in more grass, better grass, and a longer growing season, which, in turn, has led to more stock, better stock, and less supplementary feeding.

—A. S. Nash, Instructor in Agriculture, North Canterbury.

Preparation for Lucerne-sowing.

THE importance of a well-consolidated seed-bed for lucerne cannot be overstressed, especially if the seed is being drilled in. Investigation has shown that numbers of poor strikes and subsequent thin stands have resulted through sowing the seed too deeply.

Drilling has an advantage over broadcasting in that fertilizers may be applied with the seed, thus stimulating early seedling growth, and also in that more even strikes are usually obtained if drilling is at the right depth, but difficulty is sometimes experienced under dry conditions in getting the top soil sufficiently firm to ensure shallow seeding.

Shallow Cultivation.

This difficulty will be largely overcome, however, if anything in the nature of deep cultivation is avoided during the final preparation of the seed-bed. Where early cultivation has been deep and thorough, tine-harrows and roller are the only implements that should be necessary to complete cultural operations before sowing the seed.

Use the roller to firm the surface soil, and thereby encourage the germination of annual weeds, such as fat-hen, &c., and use the harrows to eradicate them. One rolling, followed by repeated harrowings at short intervals, will usually bring about the desired results, but if after such a preparation the surface soil is found to be too dry and loose to permit of shallow sowing it is an advantage to roll and leave the ground until a good shower of rain falls.

A stroke of light tine-harrows preparatory to drilling may then be necessary to obtain sufficient cover for the seed, but this in itself is helpful, as a further kill of weeds will be effected. Moreover, moisture will now be right at the surface, enabling the lucerne seed to be sown extremely shallow in a moist bed, where it can be expected to germinate quickly and evenly. The seed should be just covered, a depth of about ½ in. being ideal.

Time for Sowings.

Harrowing after drilling is seldom necessary, and, in fact, may prove detrimental. The harrows will close the drill-coulter channels, thus putting an extra cover of earth upon the seed. Rolling after drilling has nothing to recommend it on most soils. The roller also closes the drill-coulter channels, and by consolidating the surface soil may also detrimentally affect the strike and early seedling growth, especially if rain is experienced before the plants come through.

On clean, warm soils sowings may take place in October, but generally November and December are the best periods for sowing, as this allows for good cultivation and the killing of several crops of annual weeds under the systems mentioned.

—J. G. McKay, Fields Instructor, Christchurch.

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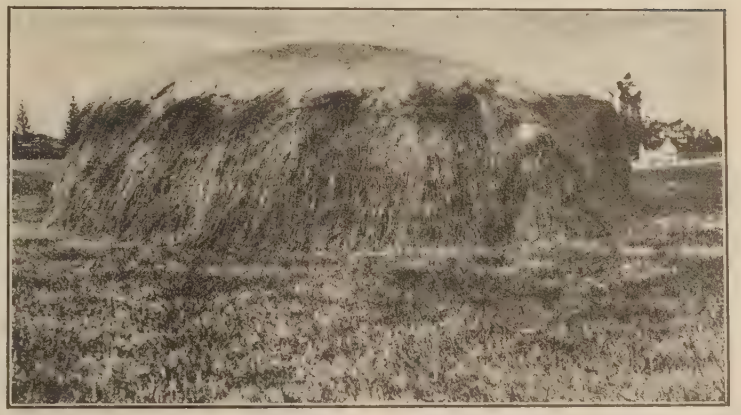
Novel Method of Weighting Ensilage Stacks.

IN the building of an ensilage stack one of the most important points to be considered is that it should be well weighted down on completion, at the same time ensuring that the material used forms a water-tight cover.

A combination of these two requisites has been adopted by a North Auckland farmer in a very ingenious manner. The land in his district, as is often the case throughout New Zealand, requires lime, and he has contrived to spread it in conjunction with feeding out.

When the stack is completed it is covered by approximately 4 tons to 6 tons of ground limestone, according to size of stack. This is smoothly raked into position, and the action of the air forms a waterproof skin over the top. In feeding out, the lime is removed with the



A lime-covered ensilage stack. As the lime consolidates rapidly by the action of air the edges hold in position.

section required, and is broken up and spread over the paddocks. A fresh portion of the paddock is dressed each time a new section is opened up.

By adopting this method the lime can be carted to the paddock during the dry months, whereas it would be more difficult to reach the same locality at the appropriate time for top-dressing, as the ground is then generally wet. When covered with earth, it is often necessary to dig fairly large holes, which later have to be filled in. The actual top-dressing is simplified by the fact that the lime is more consolidated, and the dust nuisance is eliminated.

—E. B. Glanville, Instructor in Agriculture, Whangarei.

Pampas-grass in the King Country.

PAMPAS-GRASS has definitely proved itself to be a very useful supplementary winter fodder in many parts of the Auckland Province. It is only of late years, however, that any attention has been paid to it in the King Country, and this is a district where the wintering of stock, especially cattle, is an all-important matter.

Some farmers have ridiculed the suggestion of growing pampas-grass, contending that it took too long to grow to feeding stage and that the fencing for plantations was too costly. Nevertheless, a few farmers have taken the necessary steps to establish plantations, and their efforts have been well worth while. Providing sufficient care is taken of plantations in their young stage, pampas-grass can be grown quite successfully in this part of the province. Perhaps the growth to feeding-off stage is not as great as in parts of the Waikato, but the wait of an extra year or even two years is well worth the ultimate gain.

Cattle are undoubtedly the best medium for controlling and crushing out secondary growth, and unless some means are found for feeding these cattle at the dormant times of the year secondary growth must increase and more and more country must be abandoned. To crush fern and other secondary growth successfully, cattle must come out of the winter in a strong and healthy condition, and July, August, and September are the critical times for feed. A plantation of pampas-grass in full growing condition must be an asset in bringing cattle through the latter months of the winter and the early spring, and a daily ration of the grass will help to keep them in the condition so much desired.

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Establishment.

The establishment of pampas-grass is not easy on hill country because of secondary growth, such as bracken fern, and plantations require some attention in the early stages to prevent the choking of the young plants, but once firmly rooted the plants are hard to kill, and will grow tall and spindly if not kept free from fern. However, this is not to be desired, and every effort should be made to help the plants to stool out and form good bushes.

If an area of pampas is brought through its first year in good thriving condition secondary growth does not present a great problem, and it has little chance from then onwards. Once an area has been fed off, the secondary growth disappears completely because of the trampling of cattle.

Established Plantations.

One plantation at Nihoniho, in the Ohura district, has come to good feeding-off stage in just two years from planting out. Originally the seedling plants were a nursery, which was specially prepared at the farm homestead, and were kept there for just one year. The tops were then cut off to within 8 in. of the ground surface and the plants lifted and put straight out into the permanent plantation, which is situated in the head of a steep gully. At the present time this area is looking exceptionally well, and feeding off is to begin in August. It should be mentioned that on only two occasions has this plantation been cleaned of rubbish such as bracken fern.

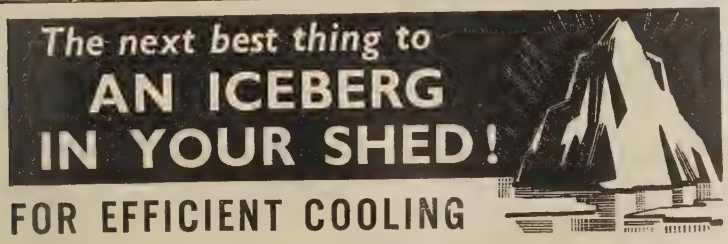
As a direct contrast, a plantation in the same district has never been looked after and has bracken fern up to 6 ft. and 7 ft. in height growing over at least two-thirds of the area. Almost all the pampas plants are alive, and in the fern are tall and spindly and just showing through the top. This area would have been as good as the one previously mentioned had it been kept clean, but it definitely proves the persistence of the plants once they are firmly rooted.

Experiments with Pampas-grass.

This year the Department of Agriculture, in co-operation with Mr. Fougere, a farmer of Tatu, Ohura, is planting 8 acres of steep, unploughable country in pampas-grass. The experiment will undoubtedly prove that pampas-grass can be grown on the hardest of country, and with average care the venture should be most successful.

There is decidedly a future for pampas-grass in the King Country, and it is to be hoped that many more farmers will take an interest in it and set up areas on their farms. Admittedly it means some outlay in fencing and a long wait, but the ultimate gain is well worth the effort.

—J. M. Hopkins, Instructor in Agriculture, Taumarunui.



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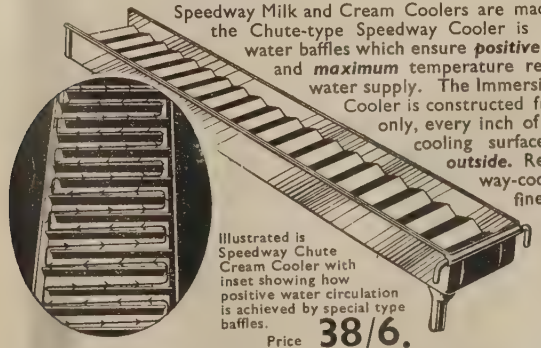

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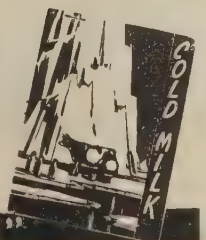


"SUPERFINE ALL THE TIME"

Top-dressing with Basic Super.

O. W. (Umawera, Hokianga) asks:—

Can you tell me if basic super would give good results on land that responds well to basic slag, and would it be as good as slag? I am not yet in a position to put on lime because of the extra labour it would involve, so I would like to know the value of basic super. It seems not to be used very much.

The Fields Division replies:—

At the same quantity per acre, basic slag would give a better response than basic super on the soils in your district. The soils in the Umawera district require lime in fairly liberal quantities before a satisfactory response could be expected from superphosphate. The lime in basic super would assist in this respect. Basic super is not used to any great extent because of the high cost of the lime content; it is much less costly to mix lime and super on the farm and obtain the advantage of the free railage on lime. As you are not in a position to use liberal quantities of lime, it would pay you best to use basic slag.

Bamboo Hedges.

Fig. 1.—Bamboo hedges on the Aka Aka swamp. Note the poor growth of the pampas-grass hedge compared with that of the bamboo.

THERE have been a number of articles recently in the *Journal of Agriculture* dealing fully and well with the value of different trees and plants for hedges in different districts. Hedges are of particular value on level country, where there are no hills to impede the force of the wind.

The Ake Ake swamp, lying to the north of the Waikato River as it enters the sea, consists of thousands of acres of alluvial, heavy soil derived from fine particles of pumice brought down by the Waikato River. There are small areas near the hills where peat has accumulated, but most of the swamp is alluvial. The area has been drained by large, deep drains along the roadsides, to which are connected subsidiary drains from the farms. Hedges have been provided by planting a few trees, principally macrocarpa, but chiefly by planting flax, pampas grass, and bamboo. Trees were difficult to establish because of strong winds.

Easily Established.

The illustrations show the magnificent bamboo hedges, which excel because of their rapidity of growth and dense, fairly high shelter. The hedges are easily established by planting single stems with roots attached every foot or so. The bamboo leaves and shoots are most readily eaten by stock and the young plants must be fenced off.

The fences should be placed about 3 yards apart, with a single row of young plants about 1 ft. apart. The young plants should comprise a good root and a stem about 3 ft. high with some leaves. Planting should take place in the autumn. The bamboo plant spreads by sending underground creeping stems in all directions, from which spring up a dense mass of stems and leaves. As soon as the bamboo has spread to within reaching distance of the stock it is immediately checked. Hence the desirability of having the confining fences so far apart that a thick hedge is obtained.

Best on Alluvial Swamps.

On high country the bamboo hedge is slow to grow and has so far not found favour, but on alluvial swamps it is the best type of hedge that can be planted. It requires no attention as far as cutting or topping is concerned. There is no ground draught if sufficient thickness is allowed. It dwarfs the pampas-grass hedge, and the flax hedge is a puny thing alongside it. Bamboo hedges should not be planted next to areas where continuous cultivation is being practised. Where fields are only occasionally ploughed and cultivated there is no fear of its spread.

—J. E. Bell, Instructor in Agriculture, Auckland.

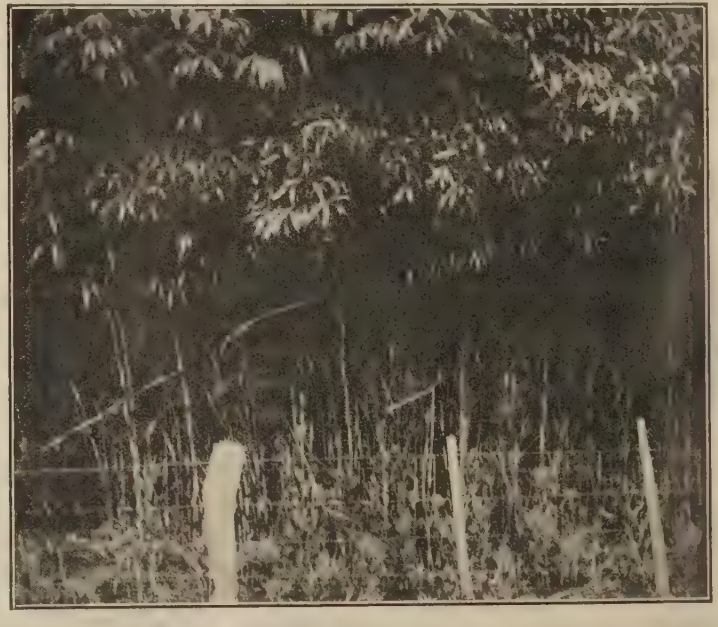


Fig. 2.—A close-up of a bamboo hedge. Note how the stock are keeping the young shoots subdued.

Outstanding Response of Subterranean Clover.

THAT subterranean clover responds readily to a phosphatic dressing is now almost universally conceded, but it is seldom that such an outstanding result is obtained as that visible on the farm of Mr. H. Baker, Marlborough.

The stand of subterranean clover shown in the illustration has been down for more than twelve years, and in its earlier stages top-dressing was not carried out, but more recently a regular programme has been entered into. Last season approximately 90 lb. of super to the acre was applied, and the increase in growth on the manured section was remarkable.

It is apparent that, although there is an equally great number of plants on the unmanured portion, very little growth has taken place there even under the excellent growth conditions experienced in Marlborough this season, while the growth on the manured portion is much more abundant and is extremely vigorous.

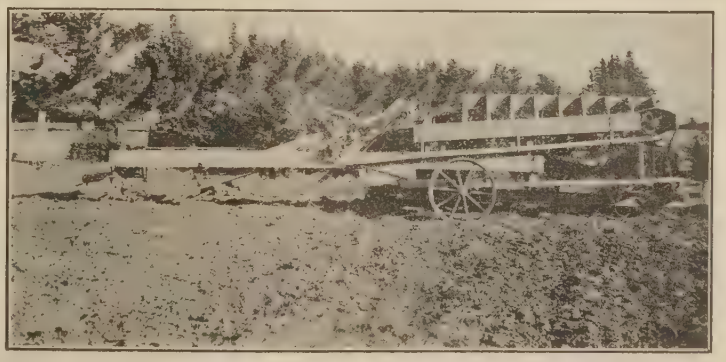
—D. R. Wilkie, Instructor in Agriculture, Blenheim.

Showing the abundant and vigorous growth on the right of subterranean clover which was treated with superphosphate as compared with the unmanured portion on the left.

Potato-lifting Machine.

THE mechanical lifting of the potato crop where large areas have to be handled has an advantage over hand-digging in that it speeds up the work, and quite a satisfactory job can be made if conditions are favourable. A farmer in the Annat district who grows from 25 acres to 50 acres of potatoes in a season has carried mechanical lifting a stage further by having a machine constructed by which the potatoes may be dug and graded into sacks in one operation.

An elevator type of digger is fitted with an extra long apron, up which the potatoes pass on to a short, steep, extension elevator, which carries them on to a travelling platform. From there they are hand-graded and put into sacks by four or five men stationed at intervals along one side of the platform. Along the other side of this platform sacks are hooked on to the outside of portholes. There are eight of these portholes in all, and the platform itself is sufficiently narrow to enable the pickers to put the potatoes across into the various portholes without difficulty.



The mechanical potato-lifter described in this article.

On the porthole side a low, wide platform is also provided to accommodate a number of full sacks of potatoes. As the potato haulms have to be dealt with before they reach the grading platform, one man is seated over the extension elevator to take off the haulms and throw them on to a side shute, from which they pass out on to the ground. The machine is drawn by a tractor worked in low gear, and the extension elevator and grading apron are driven by power take-off from the tractor.

Under favourable conditions it is estimated that up to two hundred and twenty sacks of potatoes per day can be handled with this machine.

—J. G. McKay, Fields Instructor, Christchurch.

Haystacks and their Protection.

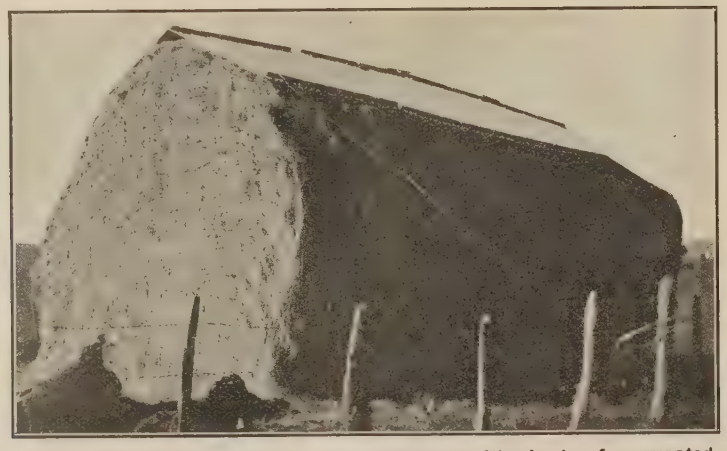


Fig. 1.—A well-built stack fenced and covered with sheets of corrugated iron. Note the high centre.

MUCH valuable food, labour, and money is often wasted through neglect of details. As the hay-making season will soon be here, a little extra time spent in attention to detail will be amply repaid when stock are supplied with good winter hay.

Stack-protection should start when the first load of hay is put into the stack. The stack should be build on a rise, and should have a high, well-tramped, solid centre, which will gradually become higher as the stack approaches completion. This is the essence of all stacking, as half the battle is won if the stack is water-tight.

Fig. 2.—A stack damaged by stock, and much good feed wasted in the surrounding quagmire.

Must be Water-tight.

In districts with a light rainfall this is all that is necessary to protect the hay, providing the stack is well raked and all surface straw is turned in a downward direction, leaving water little obstruction and every encouragement to run off.

In heavy-rainfall districts, however, several secondary measures are resorted to as additional guarantees against the ravages of the weather and as an assurance of sound hay for winter feed. Some stacks are thatched, some are covered with bag or canvas covers, and others, by far the most numerous in recent years, with sheets of iron.

Iron Covers.

Several types of iron covers are used, but the most efficient are made of standard size corrugated-iron sheets nailed on to

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4 in. by 2 in. wooden battens with the battens bolted together and the sheets overlapping at the top of the ridge and at the sides. This gives absolute protection to the hay, and reduces wastage to a minimum.

Another protection, which is seldom seen, is a drain dug around the stack to take away all water and to prevent the base from becoming wet. This drain should be about 1 ft. deep and 1 ft. out from the base of the stack.

Finally, now that the stack is protected from the weather, the only other protection necessary is from stock. All stacks should be securely fenced, with fences far enough out from the stack to prevent stock from reaching over and damaging the sides.

—W. T. Brown, Instructor in Agriculture, Hamilton.

Fig. 3.—A stack protected from stock but not from the weather. Note the low, sagging centre and water seepages.

Autumn-sown Oats with Lucerne.

THE autumn-sowing of oats in lucerne stands is a common practice with South Taranaki farmers. It is claimed that by so doing the invasion of winter weed-growth is prevented, lucerne plants are given shelter, and an early, bulky, spring crop can be taken off without any harmful effect to the lucerne crop itself.

Field observations have clearly demonstrated the value of sowing oats with lucerne crops for weed-suppression and also its usefulness in providing an early ensilage crop, but some doubt existed as to its subsequent effect on the lucerne stand itself. It was with the object of gaining some information on this aspect that trials have been carried out at the Waimate West Demonstration Farm during the past three seasons.

Trials Described.

Trials were conducted on an eight-acre lucerne paddock containing an old and young stand (halves respectively being sown in 1930 and 1934), across which half-chain strips were laid out, receiving the following treatments:—

(*a*) Ordinary treatment, no oats sown.

(*b*) Algerian oats, 1½ bushels per acre.

(*c*) Algerian oats, 2½ bushels per acre.

The first sowing was done in April, 1935, followed by similar sowings during March or April in 1936 and 1937, thus giving the experience of three seasons. The seed of the first year's sowing was severely attacked by birds and a thin oat crop resulted, with little difference between plots (*b*) and (*c*). The second and third years' establishment was all that could be desired, the density and bulk of material from the 2½-bushels-per-acre sowing being very much superior to that of the 1½-bushels sowing.

Comments.

The first cut of the season was taken off during late October and early November, and, in accordance with the usual practice, was made into ensilage. The oat plots provided a good, bulky, clean crop of mixed oat and lucerne material, whereas the lucerne plot gave only a light crop containing much *Poa annua*, fumitory, and other weed growth.

The recovery of the plots was particularly interesting. The control area showed the quickest growth, this being noticeable in the early stages, followed by the lighter, and lastly by the heavier-sown oat plots. By the time the second crop was ready for cutting the plots had evened up. At this stage the plots wintered with oats were much freer of weed-growth, and the after-crop cultivation in these plots was made much easier.

Regarding the oat-seeding rates, it was found that 1½ bushels per acre was ample for the purpose required. The heavier seeding of 2½ bushels had the tendency to suppress the spring growth of the lucerne, and, furthermore, the extra bulkiness of the oat crop was liable to become lodged.

Summary.

The evidence obtained from these trials is that the autumn-sowing of Algerian oats in lucerne stands is decidedly advantageous, that about 1½ bushels of seed per acre is adequate, and that heavy sowing should be avoided. It must be borne in mind that the crops under trial were cut early. This is an important factor, as the aim should be to take off the oat crop when reasonable lucerne-growing conditions have commenced, thus enhancing the second "all lucerne" crop rather than prolonging the oat-growth so as to secure a heavy yielding first crop.

The general procedure followed in autumn-sowing of oats is to drill in the seed with the ordinary grain-drill following the after-cultivation of the last lucerne crop of the season. Cultivation usually consists of one to two strokes with a scarifier and then a harrowing, after which the oats are drilled in with 2 cwt. to 3 cwt. of a phosphatic fertilizer.

—J. E. Davies, Instructor in Agriculture, Hawera.

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Section for Irrigation Areas.

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Storage Dams for Irrigation.

Butchers' Dam, near Alexandra, showing the reinforced-concrete wall built across the mouth of Butchers' Creek Gorge, with the stored water in the background. *[H. Drake, photo.*

THE irrigation systems of Central Otago are mainly linked up with dams, from which water for irrigation is drawn off as required.

The country is composed of the comparatively soft mica-schist rock which, in the course of time, has been worn down or scoured out into gorges by the action of the water in the creek.

The storage dams are a real necessity in this land of low rainfall. Many creeks are dried up or have only a trickle of water in them during the summer, while in the spring, when the snow is thawing, or after a cloud-burst they may be raging torrents.

The necessity for storing water can also be realized by the fact that for many months on end drought conditions may prevail. In fact, during the six months of last year from June to November only 2·16 in. of rain was recorded at Alexandra. To depend on the natural flow of the creeks or rivers for irrigation during these periods would be courting disaster, and consequently the salvation of the irrigated areas is found in the storage dams erected by the Public Works Department.

The photograph is of Butchers' Dam, near Alexandra, and shows the reinforced-concrete wall built across the mouth of Butchers' Creek Gorge, with the stored water in the background.

This is typical of most of the dams constructed for storing water. The nature of the country lends itself to this type of work, and many natural dam-sites may be located throughout the district.

—G. G. Calder, Instructor in Agriculture, Alexandra.

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Horticultural Instruction.

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Orchard Notes.

Disease Control and Harvesting.

THE principal limiting factors in fruit-production are disease control and the conservation of soil moisture during the growing season, upon which depends the ability of the trees to absorb soil nutriments and thus to expand or retain vigour in themselves and also to develop a fruit crop. The main activities connected with actual production during the growing season are therefore in spraying for disease control and in the cultivation of the soil.

These operations should continue until the approach of the harvest-time. Fruit-thinning is an important factor in improving the developing crop, and will still be engaging the attention of orchardists during the coming month. In addition to the work connected with actual production, preparation for the approaching fruit harvest will demand some thought and attention.

Fig. 1.—A substantially-built case-making bench with nail stripper and suggested convenient arrangement of timber.

Disease Control.

The general spray programme included in notes in the September issue of the *Journal* will serve as a guide for the remainder of the season. Fruit-trees will soon be at a stage when a fair amount of new growth will normally have been produced. Due to the fact that trees will not have begun to open with the weight of the developing fruit crop, as occurs later, the additional growth will result in the maximum density for most varieties occurring during December and January, when complete coverage is more difficult to secure.

This synchronizes with the period when fruit is swelling rapidly and spray coverage requires frequent renewal, and at the same time insect pests become more active, due to warmer and often drier conditions. The period ahead may therefore be regarded as the most critical in guarding against damage from pests, when a determined effort will be required to secure satisfactory results.

Perfect Coverage.

Perfect coverage is an essential feature in spraying, and success depends largely on the spraying plant used. With good volume delivery, which is regulated by the pressure and the size of the apertures in the nozzle disks, the operator is so assisted that even dense trees may be adequately sprayed if reasonable care is taken, but if inadequate equipment is used for spraying large or dense trees the chances are very much against an adequate coverage. The variation in results secured by different growers carrying out a similar spraying programme under comparable conditions is largely accounted for in this way.

When equipment of inadequate capacity is employed, greater time and greater care must be exercised in thoroughly wetting every branch, twig, leaf, and fruit. To do this, more gallons of spray per tree will be required than formerly.

Spraying of Apples.

The spraying of apples may require some modification as the season progresses, especially in reducing the strength

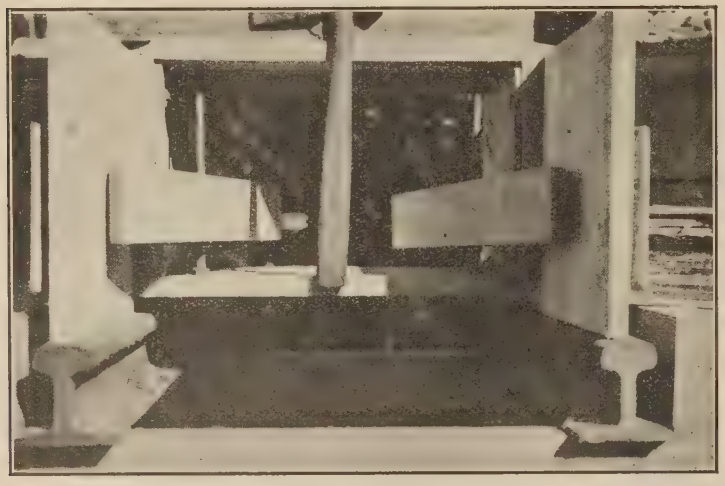

Fig. 2.—A closer view of Fig. 1, showing the solid bed of railway irons and grips for the case ends, with the case ends in position. The inside guides are pivoted in the centre and connected at the back by a spiral spring.

of lime-sulphur used. Unless growth is fairly vigorous there is danger of causing foliage injury to at least some varieties when lime-sulphur is used at a greater strength than 1–180 in the latter part of the season. For Cox's Orange and Dunns —varieties normally tender in foliage and producing fruit rather easily russeted— it is advisable to use as a fungicide colloidal sulphur 2 lb. to 100 gallons only. On all other varieties a combination of lime-sulphur and colloidal sulphur is preferred, but lime-sulphur may be reduced in strength to 1–200 or even much weaker if conditions are dry and trees are feeling the stress of a heavy crop.

Those growers who have given sufficient attention to the earlier and foundation sprays will reap the advantage of being able to weaken the summer applications. In such circumstances there is no suspicion of foliage injury, but, on the contrary, the tone of foliage has been improved, vigour restored, and yield increased, with russeting reduced to a minimum.

Spraying of Stone Fruit.

Stone fruit will require to be sprayed with sulphur sprays very near harvesting, in order to minimize the danger from brown-rot infection. Should conditions be at all humid, lime-sulphur 1–200 plus colloidal sulphur 2 lb. to 100 gallons will give the most satisfactory results. Should brown-rot occur, it is very important to avoid handling both clean fruit and diseased fruit at the same time; otherwise, contact with diseased fruit will cause further loss in the clean fruit harvested.

Cherry-trees will require some attention to prevent injury from leech. It is advisable to spray with arsenate of lead, 1½ lb. to 100 gallons, prior to colouring and immediately after harvesting. Serious foliage injury often occurs through failure to take any measures to control this pest, although one or two sprayings will give protection.

Cultivation.

The land should now be in good tilth generally, and for the remainder of the season only light cultivation is necessary. By keeping the surface disturbed during the hot weather not only are weed seedlings readily destroyed and the land kept clean, but moisture is being conserved.

Deep cultivation is not advisable, as tender rootlets which penetrate into the top soil should be allowed to function as freely as possible. The cultivation should be continued, with the object of having a good seed-bed ready for the possible sowing of a cover-crop later.

Fruit-thinning.

The operation of fruit-thinning, if well carried out, will more than compensate a grower for the expense attached to it. The more obvious benefit from fruit-thinning is the general increase in the size of fruits remaining and greater uniformity in size, both important factors in reducing harvesting, grading, and packing costs. It provides an opportunity of eliminating diseased or damaged fruit from the crop. Through adequate spacing and the breaking-up of tight clusters of fruit better spray coverage is made possible, and disease is reduced.

In the event of a heavy setting of apples or pears, fruits should be reduced to one to a spur at least. Short-stemmed apple varieties usually require thinning to single fruits to prevent their being forced from the spurs as the fruits swell and press against each other. Thinning should be done in such a way as to leave the stem attached to the spur, thus avoiding any weakening of the fruit retained.

Grafts.

Some attention should be given to grafts by cutting binding-material, where used, so that there is no possibility of scions being injured by the material tightening as the scion swells. Tender shoots from grafts should be protected from possible wind damage by tying them to light laths of wood attached to the stocks.

Preparation for the Fruit Harvest.

Harvesting-time is rapidly approaching, with early plums and peaches requiring attention in early December. Some preparation is necessary if the main fruit crop is to be harvested satisfactorily. The first consideration should be a supply of cases. Material should be on hand as early as possible, so that advantage may be taken of all available time in case-making.

The bulk supply of dry cases should be well in sight before the season begins. Growers should estimate their requirements and make them known as early as

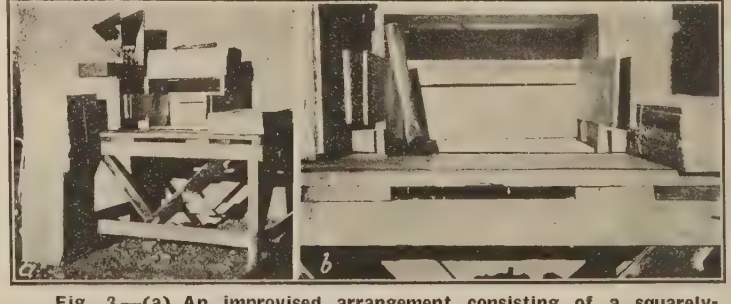

Fig. 3.—(a) An improvised arrangement consisting of a squarely-constructed fruit-case nailed to the bench. Pieces of case timber are nailed inside and outside the end pieces to form grips for the case ends. (b) A closer view of (a).

possible, so that the organization of case-supply may be made easier and the danger avoided of not being able to secure dry cases during the season.

In further preparation for the main harvesting season packing-shed equipment should be overhauled, packing-boxes sorted out and repaired if necessary and cleaned, and the packing-shed itself put in order. It should be possible by this time to estimate with a fair degree of accuracy the possible yield in different varieties grown, and to arrange for the necessary supplies.

Making the Cases.

Growers generally would find it an advantage to keep crop records of different blocks from year to year; then, by comparing the current season with a former one, they can arrive at a reasonably accurate idea of possible crop. As case-making will be an important activity during the months immediately ahead, a few suggestions may assist.

A good solid bench with a convenient arrangement of timber facilitates the work. Elaborately constructed case-making benches as illustrated are in use in some places, the main feature of them being a firm bed on which to place the case-ends (sometimes railway irons), and grips to hold the ends firmly and squarely while the sides and bottom are nailed. A good improvised bench with the same principle may be quickly and cheaply constructed as illustrated. Cleats nailed to the bench as the only support to the case-ends give insufficient support to the ends for a case to be made either quickly or squarely.

—N. J. Adamson, District Supervisor, Nelson.

Citrus Culture.

General Management of the Trees.

AS mentioned in the October notes, the chief essential during the past five months has been picking. Unless citrus fruit is picked regularly every three or four weeks and put to cure the trees in the orchard remain heavily laden with fruit. The result has been large quantities of yellow lemons, nearly tree-ripe, forwarded for curing when markets were overstocked. Not only was the fruit yellow, but in many instances it was of a very irregular size.

Too much inferior fruit is forwarded, and this is not only a handicap to any marketing organization, but is also often a liability to the grower. All mature fruit should be picked immediately if this has not already been done. A sorting in the orchard is essential after picking. It will save cartage and sorting charges in any depot, as such charges would be a debit against the better fruit. Not only will the delay in picking have affected the fruit, but it will also have affected the trees. The result is an oversupply of lemons, and then possibly next year a scarcity of lemons through a poor fruit set this spring.

Any form of marketing organization will have great difficulty in distribution unless growers make every effort to produce an even supply of fruit. Every one realizes that crop production will vary from season to season, but the grower should endeavour to minimize rather than to accentuate such variations.

Cultivation and Manuring.

Continue efforts towards a good tilth, but avoid overworking on the lighter soils where cultivation with a rotary hoe may result in erosion. It is much better to have weeds than a soil washed by heavy rains which may occur at any time during the summer months.

Budding.

The sap is now flowing and the bark will lift readily, and the time is opportune to top-work citrus trees to a better variety or strain. If one variety has proved unsuitable and another satisfactory in a locality, careful bud selection from the better trees will improve the orchard.

Red Scale.

To control red scale a certified summer oil, 1 in 33, is recommended, applied from December to March at intervals of three to four weeks. Two thorough sprays should be sufficient, but if the orchard was infested last year three sprays will be necessary. All excessively infected material should also have been removed and burnt. Every effort should be made this summer to control red scale, and a careful note should be taken as to the date of application and quantity of oil used.

The guidance of the local Orchard Instructor should also be called upon if previous efforts have been unsuccessful, in order that he may see the spraying being done. He is then in the position to verify thoroughness of application, which is so vital. As scientific investigations for the control of red scale are proceeding, reliable data is desirable (see the *Journal*, August, 1938).

Thrips.

If thrips are present a silvery appearance will be seen on leaves, stem, and fruit. To control, add 1 in 800 nicotine sulphate to the summer-oil sprays. This insect pest can become very damaging if not controlled when first noted in an orchard (*Journal*, July, 1938, p. 28).

Borer.

If the area under a citrus tree is kept free of weeds during the summer months the ravages of the lemon-tree borer can readily be noted by borings of fine sawdust. On being located, the branch should be pruned off and burned, or, if it is a larger limb, it should be injected with benzine from a small oil-can and the hole plugged with soap.

Weevil.

The activities of dicky rice weevil have caused considerable damage to one orchard in Avondale, and growers are warned to report any symptoms noted on fruit. General tree banding is not advocated unless this weevil is discovered in the locality (May *Journal*, p. 345).

Valencia Oranges.

The crop of Valencia late oranges will be picked this month, and every effort must be made to pick all fruit before any drying-out tendency becomes manifest.

—L. Paynter, Orchard Instructor, Auckland.

Spray for Oranges.

In the Citrus Notes in the October issue the recommended spray for oranges should read:—

November
December } 2 lb. basic arsenate of lead per 100 gallons of water for leaf-roller caterpillar.

Viticulture.

Phylloxera-resistant Stocks.

(Continued from October issue.)

A SHORT description of the leading species of the pure American *Phylloxera*-resistant vines employed in producing the hybrid stocks now in use in New Zealand will be useful when considering the qualities, or possible defects, of these stocks for the purpose they are intended.

The Riparias.

The natural habitat of this species and its varieties is along the banks of streams and alluvial soils in which there is little lime. Consequently, it does not prosper in soils containing more than 15 per cent. of lime, nor in dry, compact, and hard soils. It requires well-worked, deep, and cool soils.

The affinity of the *Riparias* for *Vinefera* sorts is not altogether satisfactory, as the growth of the wood does not keep up with that of the scion wood. This is especially noticeable on unsuitable soils. On suitable soils, however, the vigour of the *Riparias* is remarkable, even when grafted. Vines grafted on this stock produce abundant crops which ripen about a week earlier than the same sorts on their own roots.

Two varieties of *Riparia*—the *Riparia Gloire de Montpellier* and *Riparia Grande Glabre*—are now being superseded by hybrids having the qualities of the *Riparias* without their faults. Of the two, the *Riparia Gloire* proved to be the better.

Principal Characteristics.

The principal characteristics of the *Riparias* are: Roots—fine and covered with rootlets; wood (of the two varieties mentioned)—cylindrical, smooth, shiny, and glossy; shoots—of constant diameter; leaves—longer than broad, thin, lobes formed by long teeth at the end of lateral ribs, smooth on upper surface, a few stiff hairs on the underside on the ribs; teeth—pointed, sharp, and uneven.

The cuttings of the *Riparias* root well and take the graft well.

The resistance to *Phylloxera*, which, however, should not be taken in an absolute sense, as such factors as climate, soil, cultivation, and grafting, can influence it, are given by Messrs. Viala and Ravaz as 18 (absolute immunity 20 points).

The Rupestris.

The home of the wild *Rupestris* is in the hot and dry regions extending through Texas and to the east and north of that State.

This species grows in the rocky beds of dry ravines and on other rocky or gravelly soils devoid of lime, to which most of the species are very sensitive. The *Rupestris du Lot* is an exception, and will stand up to 35 per cent. of lime in the soil without showing signs of chlorosis. *Rupestris* prosper in sun-scorched positions, and suffer when shaded. They are very vigorous growers, the most vigorous of the American species.

On too rich soils this quality is apt to cause non-setting (coulure) and late and irregular ripening. This has been very evident where *Rupestris* has been used as stocks under glass in the usual well-fed borders. Their hard, plunging roots go down deep into the soil in search of moisture, which is an advantage on poor, gravelly, or stony ground. If they encounter a hard pan, rock, or stiff clay impenetrable by the roots the vine suffers. The roots also suffer if they encounter very wet or water-logged soils, as they are very subject to root-rot and soon perish.

The affinity for *Vinefera* scions is good, and cuttings root freely.

Several Varieties Imported.

Several varieties of *Rupestris* were imported into New Zealand, but only one, the *Rupestris du Lot*, was used to any extent, and this has now been abandoned in favour of more suitable stocks.

The leading characteristics of the *Rupestris* are — Reddish-yellow, hard, long tap-roots; short and thick trunk; very long rods running along the surface of the soil, with many laterals; leaves generally small, broader than long, folded gutter-like, brilliant and very smooth, when young brilliant and transparent. The tips of growing shoots are carmine. The petiolar sinus is wide and shallow, and practically non-existent in the *Rupestris du Lot*.

Suckers are produced very freely, and are troublesome unless the cuttings are disbudded before grafting and the suckers from the vines cut out during the first three or four years.

The resistance of the *Rupestris* is good, and is allotted 18 points by Viala and Ravaz.

(To be continued.)

—J. C. Woodfin, Vine and Wine Instructor, Te Kauwhata.

Method of Creating Humus.

ON creating humus, G. H. M. (Otiu, Wanganui River) writes: Some months ago a paragraph on the Indore method of creating humus was published in your paper. I should be obliged if you would clear up a point in connection with this. Is it necessary to make use of a pit in the creation of humus by this method, and, if so, is an earth pit sufficient or would it be necessary to concrete the sides and bottom?

In reply the Horticulture Division states that the essential part in this system is what is termed the "charging trench," and the method of construction as well as its dimensions would depend upon the degree of permanency of its utilization, as well as the quantity of material to be processed.

The trench should be about 2 ft. deep. The floor should slope gently to prevent water-logging, and must discharge into a natural drainage channel. Unless the bottom is stony it must be made firm with some material, such as well-rammed shingle. The sides of the trench should be perpendicular and protected in the inside by timber; concrete would, no doubt, be much better and more permanent.

Cool Storage Notes.

Influence of Maturity on Cool Storage Life of Apples and Pears.

THE quality and appearance of apples, pears, and soft fruits when they are removed from the cool store and exposed for sale and eventually reach the consumer are affected by the maturity of the fruit when it was harvested.

To arrive at a definite date for harvesting the different varieties of fruits from season to season is not practicable because of the influence of the season on maturing fruits. The experienced orchardist is able to judge by the appearance of the fruit and the condition of the seed-pods and seeds, and the moisture content and appearance of the texture all combine to convey to those with experience the state of maturity of each of the different kinds of fruits and also of each variety.

There are some varieties, however, which present difficulties even to the experienced orchardist in deciding their readiness for picking and cool storing. The Granny Smith requires attention as to the time of picking and cool storing if the best results are to be obtained after cool storage and until it is consumed, and if this variety is to maintain its popularity.

Early Export Fruit.

Although it is sometimes necessary to harvest the first exported fruits in a somewhat immature condition in order that they may be shipped and sold on the overseas markets as the first of the new season's crop, this class of fruit should never be harvested for cool storage and held for local-market requirements. It must be allowed to mature on the tree and then given pre-cool storage treatment if the nature and condition of the variety requires such treatment.

Pears are also affected in their cool storage and after-storage life by their maturity. They must be well grown and fully matured on the tree. When harvested they should be placed in cool storage immediately. There are some varieties which are affected by disorders in cool storage for which, as yet, there is no known method of control. These are varieties which are slowly but surely being replaced by more reliable cool-storage performers.

Length of Storage.

Pre-cooling and long storage of fruit with the same cool-storage equipment is one of the difficulties of the export and local market fruit requirements. This cool store must be designed to pre-cool packed export fruit quickly and efficiently and to give the best results in the holding of long-storage varieties.

This can be accomplished by using direct expansion ceiling coils with full defrosting and air-circulation equipment for pre-cooling export fruit. The fans are in use only when required and at speeds that may be controlled. The circulation should be from the floor to ceiling, using a false ceiling for distribution.

—A. Powell, Cool Storage Officer, Wellington.

Mineral Fertilizers.

INFORMATION on mineral fertilizers is sought by E. P. D. (Pelorus Sound), who writes :—

(1) As I live by the sea, would it not be more valuable to use diluted sea-water on my garden? I have already used it after copious rain on my lemon and apple trees, without bad effects so far (three weeks). (2) I have many very old rusty kerosene-tins. I keep them rusted well in water and use the rust water. Is there a quicker and more effective way of making the iron available? (3) What other elements would be present in the rust? Would magnesium be present? I have no special reason for thinking that my soil is deficient in any one mineral, but I am anxious to take no risks. (4) How can I be sure that copper, manganese, sulphur, florine, and iodine are there? Should iodine be available from the sea-water itself? I apply seaweed when available (I apply zinc sulphate, by spraying the leaves), and thought that possibly copper sulphate (dilute) might also be absorbed this way. (5) What manures is it advisable to apply together? (*e.g.*, lime and superphosphate, or both separately). Superphosphate and potash? Basic slag? Should extra lime be applied with basic slag? My soil is rather similar to Wellington. It is not specially acid—in fact, very little—and gets plenty of sun. I apply wood ashes, and would like to know the advisability of burning my kitchen scraps and so getting their mineral ash, or burying them to decay as humus?

In reply, the Horticulture Division states that the application to crops of dilute sea-water, rust water, &c., as you suggest, are unlikely to be beneficial. There is little doubt that in most instances it would be the reverse.

As you have no reason to believe that your soil is deficient in any one mineral it is unwise to be anxious regarding the matter. A decision is best arrived at by considering the quality of the fruits and vegetables grown. If they are of moderate size, well-shaped, good texture and flavour, one has good reasons for being content. Should any abnormal feature be present it should be investigated, and we shall be pleased to assist you.

If the principles and practice laid down in the bulletin "Manures for Garden Crops" are followed you should have little difficulty. As your soil is a clay loam the use of lime, as advised, should be observed. The statement it contains regarding the maintenance of a supply of humus is also important; it is usually the limiting factor in intensive cropping. Under that heading seaweed is most useful, and any vegetable or animal refuse available should be stacked and fermented down for application to the land before planting.

✣ ✣ ✣

Vegetables, Small Fruits, and Flowers.

Contributed by the Horticulture Division.

General Notes for the Garden.

ASPARAGUS is a unique and distinctive vegetable which is generally popular; further, it is available in a fresh state during October and November, when, as the winter crops are finished and the "early" vegetable crops hardly ready, there is a shortage of vegetables greater than at any other season. On a light, rich soil which is always moist, such as is found along the coast and on river-flats, it grows readily, and is in good demand for the reasons stated.

The gathering of all the young spears while tender affects the vitality of the crop, but not irreparably, unless cutting is continued for a longer period than eight weeks. For this reason the harvesting of asparagus closes about the end of November, when early crops of a number of kinds of vegetables are generally available.

Methods of manuring and feeding this crop differ very widely according to soils, climate, management, &c., but usually applications are made at the end of the cutting season and in early spring. The crop requires the usual plant-foods, but is specially partial to humus, nitrogen, and potash. Early in the cutting season one or two applications of available nitrates are usually applied, and this may be followed up at the end of the cutting season with phosphates in the form of bonedust, basic slag or superphosphate, and potash—muriate or sulphate. Partially decayed animal-manure may be included, or, in its absence, a moderate dressing of nitrogen may be given. These materials should be broadcast as soon as cutting ceases and should be disked in, setting the disks shallow.

Now that the small fruits are being harvested it is customary to cease pulling rhubarb. Give it treatment somewhat similar to that mentioned above, and allow the crop to make its normal growth and build strong crowns for future cropping.

The Tomato Crop—Inside and Out.

The tomato crop under glass is now being gathered, and watering and feeding are the chief attentions required. Where the subsoil is open and the water-table low, a surface mulch of stable manure is of great assistance in retaining moisture and keeping the soil in good condition. Abundant ventilation will usually be required at all times, except during stormy periods. In sheltered localities high temperatures are sometimes excessive for fairly long periods—anything over 80° F. is generally detrimental—and a light shade provided by spraying a whitewash thinly on the roof will steady the temperature and improve the quality of the fruit.

The early planted crop outside will now be established, and pruning, tying, and cultivation will keep the grower busy. Considerable injury is sometimes done by continuing to cultivate the alleys deeply for too long a period after planting out. Serious interference with the roots is most injurious, and, as these are near the surface, cultivation must be shallow in the vicinity of the plants, which means over the whole area when they are well under way.

The late crop is planted out about the middle of December, and the preparation of the land and the hardening-off of the plants will now require attention.

Planting Winter Crops.

Leeks, savoy and red cabbage, cauliflower, broccoli, brussels sprouts, and celery are popular fresh vegetables during the winter season. Plants raised from seed sown during September or October are planted out during December and January in most districts. Generally speaking, they thrive best in the cooler localities, and usually are best planted in land from which early crops, such as peas and potatoes, have been harvested.

The leek is a hardy plant which is very little subject to pests and disease. It is available over a long season, and, when well grown and of moderate size, its mild flavour and fine qualities place it in good demand, especially for soups in winter and spring. Good-sized plants with straggling roots and tops trimmed back should be dibbled in deep without firming, merely watering them in. If the land is clean and in good heart it is a reliable cropper.

The crops of the cabbage family at this stage are, in dry weather especially, seriously attacked by insect pests—cabbage-aphis attacking the heart, and caterpillars of the diamond-back moth and white butterfly the outer leaves. It is important that the plants should be quite free from these troubles when planted out. They may be cleaned either by spraying them a few times at intervals while growing in the seed bed, or, if that has not been done, by dipping the tops in a solution of arsenate of lead and nicotine sulphate when the plants are lifted for transplanting. After planting out, a light dusting of powdered derris, applied at intervals of about two or three weeks during the dry period, will afford the crop the best protection from the attack of these pests. The plants should be set out deep and firmly.

The celery crop is commonly subject to a leaf-spot fungus disease which, after spotting, causes the blade to dry and shrivel. It can be avoided by spraying the plants with Bordeaux or preferably Burgundy mixture—a difference which lies in the substitution of washing-soda

in the place of the lime hydrate. As "prevention is better than cure," spraying should be done first while the plants are in the seed-bed and continued afterwards at intervals.

In a rich soil, and provided one always remembers that this is a water plant, there is usually little further trouble. It is also to be remembered that only the "self-blanching" varieties may be satisfactorily blanched when the plants are set out in blocks of considerable size. Other types must be planted in single rows or, at most, double rows close together, so that they may be closely moulded up with soil when the plants have nearly completed their growth in order to blanch them satisfactorily. Another method is to place 12 in. boards on edge close up to the plants down each side of the row.

Seasonable Sowings.

Important sowings now include short-horn carrots, globe beet, turnips, peas, and dwarf beans.

With deep cultivation and a good supply of humus, land does not readily tend to dry out. Such a condition, however, is specially injurious to peas, kidney-beans, marrows and other gourds, and also celery. Should such a condition threaten, a mulch of short grass clippings or other vegetable matter may be applied, as well as water at intervals to keep the crop growing. With most crops, light cultivation at intervals, especially after rain, will keep them growing satisfactorily in most districts.

The Berry Harvest.

The period between the seasons for tree fruits—that is, after the last of the stored fruit has been used up and before the new season crop is really available—is very appropriately met by the supply of berries, such as gooseberries, strawberries, loganberries, raspberries, and currants (black, red, and white). It coincides with the Christmas holidays, when berries in tarts and with cream are most popular. The season is brief and the goods perishable—that is, they are not readily stored—so that the berries have an added attraction in their comparative rarity.

The fruit is usually sent to market in fairly good order, but occasionally it is too ripe and soon loses its attractive appearance. If the fruit is at all soft the case or crate has only to be jarred by bumping it a few times, as is unavoidable in transit, and the fruit settles and becomes wet, having all the appearance of short measure. Berry fruits generally should be gathered in firmer condition, especially during warm weather and for long-distance shipment. The fruit must be dry on the surface when gathered, and should be stood in a cool, shaded place out of the dust while awaiting shipment, which should take place the same day.

Dessert fruit is packed into punnets as picked, while culinary fruit is usually placed in a tin bucket attached to the waist of the picker, which leaves both hands free for picking and avoids the jarring which otherwise takes place in lifting and setting down the bucket. For soft fruits the metal container is either heated and painted inside with paraffin wax or a coating of shellac, 1 lb. dissolved in 1 pint of methylated spirit. The best pickers are those who pick close and clean, going over the bushes on alternate days to prevent any berries from becoming over-ripe. With these precautions, these berries make a choice dish, either culinary or dessert.

Planning New Gardens.

Good gardens, like good houses, are made only by thoughtful planning and careful construction. It is one of the finest arts, and confers comfort, utility, and distinction on any home. As the most suitable period for commencing the work of construction is early autumn, any planning to be done should be started without delay, so that ample time may be given to consideration of the details. Plans should be drawn to scale in order that the different parts may be well proportioned and construction may proceed economically.

For small gardens especially, graph paper which is ruled into small squares is most convenient. First draw the garden section to scale, and then an outline of the ground-plan of the house in correct position. The garden planning proper then begins. The topography of the land and the taste of the owner are the main factors influencing design. Easy access, shelter from stormy weather, sunshine, shade, and pleasant views are all desirable features. Simplicity will facilitate maintenance without sacrificing effect.

When the ground-plan is finished the planting arrangement should be studied and planned, utilizing principally those plants which have proved themselves suited to the locality, soil, and situation.

Improving Established Gardens.

Owners of established gardens often feel despondent when they give some consideration to garden planning; they feel irreparably committed to the garden in its present form, and are rather hopeless about improvement. The fact is, there is no finality about a garden, and the changes which time brings will be for better or worse in accordance with the industry and ability of the management. Improvement in the shelter planting, planting a screen to obscure undesirable views, and removing trees to improve the outlook will often have a most beneficial effect.

To turf down beds and borders and cut and prepare new ones is simply done, and with the happiest results if the alteration has been well thought out. Herbaceous borders anywhere can only be expected to keep their condition for about four years, when reconditioning the land and replanting is necessary. These and other comparatively minor operations will greatly improve the established garden if they are done thoughtfully and carefully.

—Wm. C. Hyde, Horticulturist, Wellington.

Billington Plums in Hawke's Bay.

Billington plums planted throughout Hawke's Bay bear consistently heavy even where grown apart from any other plum variety. The want of a pollinator does not seem to be of significance in a climate where the spring and early summer are dry and sunny.

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Supers and Comb Foundation.

THE issue of late swarms should be guarded against, as they are of little value except as increase for next season. If increase is not required the swarms should be returned to the hives from which they originated if they can be traced. It is a good plan to kill the old queen in the swarm when returning it, at the same time destroying all but two queen-cells in the parent colony. If the hive is cramped an extra super may be given, and with this inducement the colony will usually settle down at once to work.

Ventilation of Hives.

The ventilation of the hives should by now be receiving every attention. Every means should be used to ensure the bees having an abundance of fresh air day and night. All weeds and other obstructions should be removed from the fronts of the hives, and the entrances enlarged as much as possible.

In extreme cases the hive-bodies should be raised from the bottom-boards by means of small blocks of wood. On no account should the bees be allowed to cluster outside the hives, and wherever they show a tendency to excessive fanning steps should be taken immediately to increase the supply of fresh air to the colonies.

Provision of Supers.

One of the necessities of a well-regulated apiary is an abundance of supers when the honey-flow is in full swing. Every inducement should be given the bees during their often brief season to gather in every available drop of nectar. No beekeeper with business acumen will allow his bees to loaf or cluster outside the hives for lack of storage-room. It is well when adding additional supers to place them between the brood-chamber and the first super, or at least to raise a few frames of honey from the first super into the second when adding the latter.

It should be understood, however, that supering must not be overdone and the bees disheartened by being given too much work at one time. On no account add a second super until the bees are well at work in the first, and in cases where the colonies are only building up well at the beginning of the honey-flow—that is, where a poor colony has been requeened and the new queen's brood has not as yet hatched—it is an excellent plan to tier up with half-stories. Many an apiarist has had a moderate return from a small colony with half-stories, when it is doubtful if any return at all would have been obtained by the use of full-depth supers.

Use of Queen-excluders.

January is the month when queen-excluders are of most use to the beekeeper, especially in southern districts. Whatever their disadvantage may be in some localities, in the south they have proved their efficiency in enabling the apiarist to finish extracting without the destruction of any brood before the hot weather ceases. They should never be used for general purposes until the main honey-flow is in full swing. By that time the bees are accustomed to working in the supers, and with nectar in abundance all around them they will work cheerfully right through the hive, passing through the holes in the excluders as if no obstruction existed.

The best method of using the excluders is as follows: All sealed brood should be raised above the excluder, and the queen confined below on drawn-out combs. The brood above the excluder should be watched for a few days in case any eggs have been elevated, as the bees will sometimes attempt to raise queen-cells above the excluder. If this happens the queen-cells should be destroyed, as the queens which will emerge from them will not be able to pass through the excluders to get mated, and will in time develop into drone-layers. By the provision of plenty of empty combs the queen will be able to cultivate laying at a sufficient rate to keep up a supply of workers, and as the brood hatches out in the upper stories the cells will be immediately filled up with honey.

Excluders are often condemned as being productive of overswarming, but in many localities swarming ceases automatically as soon as the main honey-flow commences, and if the queen is allowed plenty of room in the brood-chamber and the brood in the supers is carefully watched for the production of queen-cells very little harm can come from the use of queen-excluders, while the immense advantage of being able to extract combs entirely free of brood is worth a great deal to the apiarist at his busiest season.

Comb Foundation Essential.

False economy in the use of foundation will lead to the production of endless numbers of drones. If, on the score of expense, the beekeeper is able to buy only a limited quantity of foundation it is by far the best policy to restrict increase and utilize only full sheets in producing good combs. It is the inside of the hive that counts.

In many apiaries where good equipment is used the practice of using strips and half-sheets of foundation is far too common, and the result is that large numbers of drones are reared annually at the expense of the crop instead of a profitable force of worker bees being produced. Drones thus produced by bad combs are a tax on the hive until the end of the season. It must be fully realized that drones are consumers and not producers, and while it is impossible to prevent their production altogether, even if full sheets of foundation are used, their numbers can be considerably reduced.

The advantage of the use of foundation is that it gives the beekeeper control over the brood-chamber, and, in addition, the bees are saved the energy required for bringing in the necessary amount of honey to produce the wax. If we estimate that it takes 1½ lb. of foundation to fit up a hive, that this costs the beekeeper approximately 5s., and that to produce this amount of wax the bees must collect 18 lb. of honey of a value of, say, 9s., it is readily seen that the balance is in favour of the use of full sheets of foundation.

Drone-comb a Waste.

However carefully the beekeeper may furnish his hives with full sheets of foundation he will produce sufficient drones to supply his apiary for the season. Because drone-cells require less wax to form and less time to produce the bees will always build them wherever a gap occurs in the sheet of foundation, or wherever a stray corner exists between the sheet and the frame. From every point of view the production of drone-comb in large quantities is waste.

It has been estimated that a square foot of drone cells produces five thousand drones, while the same amount of space would produce eight thousand workers; so that by allowing the bees to build combs to suit themselves a beekeeper is not only considerably depleting his stock of producers, but is at the same time producing hordes of useless individuals which will absorb the feed and the time of the hive without any promise of ultimate return.

Devices are, at different times, placed before the beekeeping industry with a view to economizing the use of foundation and even to eliminating it altogether. There has never yet been devised any successful substitute for full sheets of foundation. The apiarist should at all times aim at getting combs as near perfect as the bees can build them, and these can only be produced by using complete sheets of foundation. Combs composed partially or entirely of drone-brood may be used as extracting-combs, but they can never profitably be placed in the brood-chamber, and in a well-regulated apiary all combs should be interchangeable.

Reducing the Cost.

Good, drawn-out worker-combs are, next to the bees themselves, absolutely the best asset the beekeeper has, and their production and care should be arranged for all the year round. Many beekeepers could minimize the cost of their foundation if they would carefully conserve every piece of waste wax which the bees produce. These pieces melted and clarified, together with cappings and any combs which may be condensed, could be consigned during the off-season to any local maker of foundation to be made up and returned to the beekeeper in time for the season.

By doing this he would find his foundation bill considerably reduced year by year. Whatever his methods may be, however, he must always bear in mind the fact that no beekeeper can be wholly successful who allows his bees to build unlimited drone-comb, and that whatever form the economy may take it should never take that of using half or quarter sheets or strips as starters of foundation.

—E. A. Earp, Senior Apiary Instructor, Wellington.

Efficient Method of Skimming Honey.

MOST beekeepers have experienced difficulty in skimming a tank of honey, but by using the following method skimming will be found to be quite a simple matter. The gadget costs practically nothing in material or labour to construct, and beekeepers are recommended to make one during the slack months in preparation for the busy season.

Obtain a piece of No. 10 gauge wire gauze, 6 in. wide, and 6 in. to 9 in. longer than the diameter of the tank to be skimmed. Fold the gauze double lengthwise and hammer flat. Next, obtain two pieces of tin 3 in. square. Fold these over at the centre, and clip one over each end of the wire gauze. Fasten these clips with small rivets or solder.

Take one end of the gauze and slide it around the inside of the tank, keeping it as close to the side of the tank as possible. Steadying the gauze with the left hand, gradually work it around the tank. When the length of gauze is in the tank, keeping it submerged about half its depth—*i.e.*, 1½ in.—carefully drag the gauze across the tank, slowly driving the scum before it.

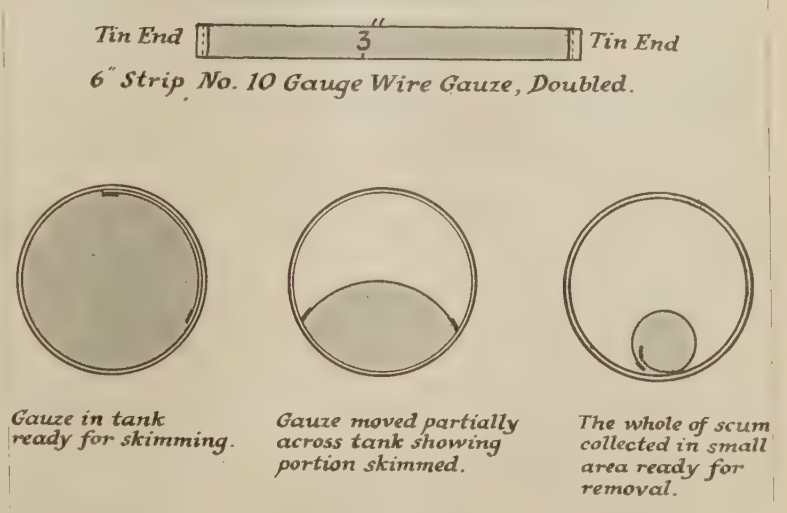
Then make the gauze into a circle, gradually making the circle smaller by passing one end around the other until the circle enclosing the scum is from 6 in. to 9 in. in diameter. The scum is now enclosed in a small circle, and can easily be removed by means of a spoon.

The operator has only a small circle to skim instead of chasing the scum over the top of the whole tank.

Two skimmings with an interval of twenty-four hours between are usually found sufficient when using this method, which will be found highly efficient.

I am indebted to Mr. J. H. Steel, of McNab, for bringing this method of skimming honey under my notice.

—D. S. Robinson, Apiary Instructor, Dunedin.


Tin End
3"
Tin End
6" Strip No. 10 Gauge Wire Gauze, Doubled.
Gauze in tank ready for skimming.
Gauze moved partially across tank showing portion skimmed.
The whole of scum collected in small area ready for removal.

Selection of Apiary-sites.

DURING the past few years there has been an unprecedented demand for apiary-sites—far greater, in fact, than at any time in the previous history of the industry. The old prejudice does not exist among the farming community to-day, and beekeepers frequently have more locations available than they can reasonably operate. Unfortunately, districts literally white with clover are not always ideal honey-producing centres, and I am afraid we are all misled at times by this type of country. On general appearance it may be excellent, but if we go further and take into consideration other factors, such as rainfall, general weather conditions, and the nature of the soil, it will often be found that the elements, except, perhaps, during abnormal seasons, are totally unfavourable.

The heavy type of country has failed to give results in Canterbury during the past few years. This may appear as rather a sweeping statement, but it is correct, and, as it is only reasonable to anticipate that the same climatic conditions will obtain in the future as in the past, we must look to the light soil for our honey. The cash value of the crop gives the true measure of success, so that if producers are unfortunate in their selection of locations expert knowledge will prove of little value and the season's work of little profit.

Type of Country.

To ensure, in such positions, that both light and heavy soil is within flight range is usually considered desirable, and there is certainly a little in favour of such a policy, as provision is thereby made for both wet and dry seasons. According to records, however, seven seasons out of the past ten have definitely been favourable for the light country. This must eventually bring about a change of ideas, but the process will not be very rapid. New producers entering the business on commercial lines are producing excellent crops of first-quality honey on country previously considered totally unsuitable for the purpose, so that this alone indicates its value.

Irrigation must not be lost sight of, as this will make available country that at the present time is useless except during extremely wet seasons. Two small areas have already been completed in Canterbury, but in view of the high summer rainfall since the schemes have been in operation it has not been possible to arrive at the value of the project—that is, of course, from the apiarist's viewpoint. We have discovered, however, that the light soil with occasional summer rain gives the honey crop, so that if the necessary moisture can be supplied by irrigation the country should prove worth while.

Some of the finest producing areas in Canterbury are in the north, but on appearance this is far from attractive, as the light nature of the soil gives one the idea that the clover would burn off during the early part of the season. This, to a degree, is correct, but at the same time the heaviest crops in the province have been taken in this class of country, and the average per colony over five years far exceeds that produced on the heavier land.

Changes in Location.

I am not advocating overstocking, as the country mentioned is now fully recovered, but I am convinced that if producers will study the conditions in their own districts, and ascertain the effects of rainfall, temperature, and soil moisture, many changes in location would result. The position, no doubt, requires a far closer study in the South Island than in the North as we rely entirely on ground flora. Consequently, good flying weather is not all that is necessary to bring about a honey-flow, and an abundance of clover over a prolonged period does not necessarily mean heavy crops. We must therefore satisfy ourselves that the conditions are such that the clover will yield nectar freely.

Then there is the question of apiary shelter and to what extent this should be carried in districts exposed to strong winds. Artificial cover or live hedges erected or grown around the apiary boundary certainly enables the beekeeper to work even when conditions are not altogether favourable, but in Canterbury, famous for north-west winds, it is doubtful if shelter of this nature, especially in open country, is advisable. A well-sheltered location (where the hives are protected from all winds) suffers a tremendous loss of field bees during a spell of boisterous weather, and I think a number of producers will support me in this statement, as evidence of this can be seen each year. I am not condemning shelter, but in view of the vast variation in climate within the space of a few miles the position is one that must be governed by locality.

Effect of Shelter.

If a district is well planted with shelter-trees the bees are afforded some measure of protection after leaving the apiary, but if the country is open and subject to strong winds the effect on the colony strength will be fully realized. It must also be remembered that what might be considered an ideal summer location is not necessarily a good winter site.

I have frequently found entirely different conditions in one apiary. Certain colonies which are partially shaded by overhanging trees, or perhaps subject to a cold wind, have been without brood, whereas others in more protected parts of the apiary maintain three or four frames. Such a condition is costly to say the least of it, and is quite unnecessary if the apiary is stocked with established colonies.

Production Costs.

Production or working costs also call for close attention, and, as transport appears to account for the major portion, it is an item that must be kept in view. Good crops tend to make us somewhat careless in this direction, and I am confident that the expenditure under this heading is responsible for a number of failures. It is a very simple matter to arrive at costs, and as this is practically a standing charge each year irrespective of the quantity of honey produced it is not difficult to ascertain the value of each apiary to the business.

I have mentioned only a few of the conditions that obtain in Canterbury, and perhaps in other parts of New Zealand. The whole question covers a tremendous field, and success depends largely on the ability and judgment used when establishing apiaries. These matters may not be considered of any great importance, but difference of opinion exists on the points I have raised, so that when we consider just how little is actually known of matters such as flight-range and the effect of ground temperatures and moisture, together with general weather conditions on various types of soil, it will be seen that there is ample scope for discussion.

Most Advantageous Position.

I fully realize how difficult it is for producers who have been established for years to transfer their stock and equipment to an entirely new district, and I am not recommending this, although in cases it may be advisable, but I do suggest that apiaries should be placed to yield maximum crops, and it is only a thorough knowledge of local conditions that will bring this about.

—*W. J. Fix, Apiary Instructor, Christchurch.*

Poultry-keeping Section.

Care of Growing Stock.

IF pullets are to stand up to the strain of continued egg-production and prove good breeding-birds they must, in addition to possessing inherited vigour, constitution, and egg-producing power, be given proper care and attention during their growing period.

It is not difficult to rear a few pullets successfully, for when kept in small lots growing stock are not overcrowded and get ample fresh air, warmth at night, and plenty of food from the time they are hatched. However, to rear successfully several hundred pullets, the majority of which will produce a profitable number of eggs for two laying seasons, calls for special and constant attention to many little details that can best be learnt by practical experience and the close observation and application of a successful man's methods.

Many pullets which lay well enough during their first six or seven laying months are reared each year, but too many fail to be really profitable for a longer period.

Value of Environment.

The beginner, at times, fails to appreciate fully the great importance of correct environment, and tries to build up his flock before he gains the necessary experience. Good eggs, day-old chicks, or perching pullets may be purchased from a reliable breeder, but if a number of these fail to come up to expectations during their growing or laying period there is often a tendency to blame the seller, when the real cause is due to some mismanagement through lack of experience and a thorough knowledge of the full requirements of growing stock.

Normal Development.

Some poultry-keepers are inclined to underfeed the early hatched birds slightly in order to check them from coming on too soon or to overforce the later pullets in the hope of bringing them on. Such methods are a mistake, especially if carried too far, for experience has proved that steady normal development will give the most satisfactory results and that any deviation from natural development has a tendency to reduce vitality.

Fig. 1.—A handy frame for catching chickens made of two frames of 3 in. by 1 in. timber, one 3 ft. square and the other 3 ft. by 6 ft. These frames are covered with 1 in. mesh netting, and are hinged together.

When birds are reared on the intensive system it is even more necessary that management be of the best and all little details be regularly attended to, for the further we get from nature the more skill and close observation is required to be successful.

It is true that early hatched chicks grow faster and better and are usually much less trouble to rear than those hatched later. This is no doubt partly due to the fact that the early chicks get much more rest during the longer nights of late winter and early spring and that they seem to do better during cooler weather. To retard their natural development by under-feeding, however, has not proved the most profitable procedure.

Feeding.

After the first few days it is difficult to over-feed growing stock. They require plenty of good, plain food, and this should be given at regular times and should consist of as much as they will clear up without waste. With early hatched birds it is advisable to reduce the amount of animal feed being fed to about 5 per cent. between the ages of three and five months, but it is wise to keep up the supply of good feed to provide growth.

With the later hatched birds an extra feed of mash each day will often assist development, but, as already indicated, to overforce with animal feed has a tendency to reduce vitality.

At times, growing stock seem to go off their feed, especially between three and four months old, and they will sometimes leave their grain or mash. This need not cause much concern, but it is advisable to try to get them back on their feed as soon as possible. A change to a fresh house or pen often sets them

up, or a little extra of what they are cleaning up and a little less of what they are leaving, or some extra succulent green food, has often sharpened up appetites.

The Start of Laying.

Well-reared utility pullets should come on to lay between five and a half and six and a half months. In almost every flock, of course, there will be some precocious pullets that will come to maturity and start laying at about four and a half months old. Such birds are seldom very profitable, as they have matured before their frames have had time to develop, with the result that they are usually small and lay small eggs. Such birds should not be used for breeding.

If only 1 per cent. or 2 per cent. of a flock mature at that early age it should not cause worry, but where too many birds start laying at too early an age and the average size of the birds is not being maintained it would indicate that either too much animal feed has been fed or that nature is sending a warning that selection for egg-production has gone a little too far, and that more care regarding size and breed characters when selecting breeding-birds should be given in the future. Also, some fresh blood may be required.

If utility birds are seven and eight months old before they start to lay it would indicate that insufficient feed has been given during their growing period. Growing stock show the result of mismanagement more quickly than adult birds. The well-reared flock will always be even in size and very active, and will show that desired healthy strength and ruggedness. It is well to remember that in the production of strong, vigorous young stock care and feeding are even more important than breeding.

Fresh Air.

As young stock get older they require more perching space and fresh air to enable them to make that desired normal development, but if they are compelled to roost in overcrowded or poorly ventilated houses they cannot build up that strength and health so very necessary for continued egg-production and disease-resisting power. One of the greatest advances in poultry culture is the realization of the great importance of fresh air.

Our most popular canopy type of brooder, under which three hundred to four hundred chickens can be brooded successfully, owes its success largely to the fact that the chickens get plenty of fresh air as well as a regular amount of warmth. The most successful up-to-date fowlhouses have plenty of height and depth and more or less open fronts, in addition to back ventilation.

Moisture is constantly being given off from the bird's body by means of their breath and fæces, and unless the house is well ventilated the air seems to become damp and unhealthy. It has been estimated that one hundred hens will give off 3 gallons of moisture in twenty-four hours.

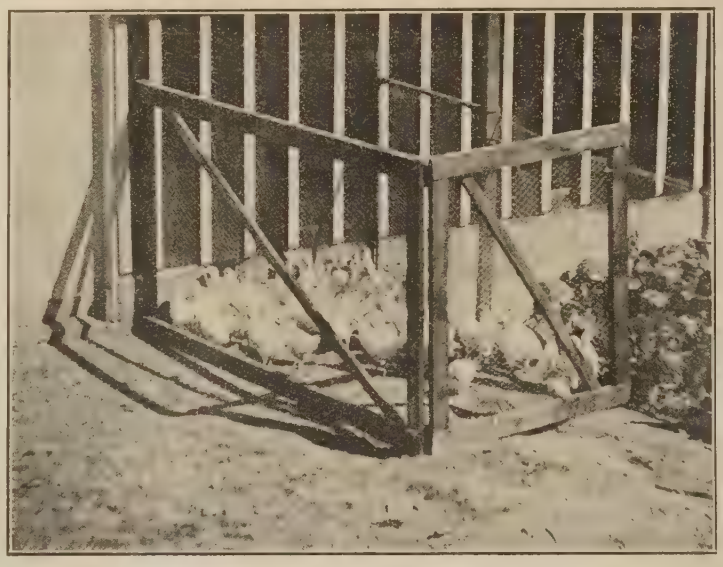


Fig. 2.—The chickens rounded up inside the frame.

W. A. Lippencott, in his book "Poultry Production," makes the following observations regarding this matter :—

> "Ventilation in the poultry-house is important for the purpose of removing moisture, and to supply the air requirements of the fowls. Although air requirements cannot be stated specifically in terms of a definite minimum it is interesting to note that Colin, a French physiologist, is quoted by King (1910) in respect to air breathed by different animals per 1,000 lb. live-weight each twenty-four hours as follows :—
>
> | | "Cubic Feet. |
> |---|---|
> | "Cow | 2,804 |
> | "Horse | 3,401 |
> | "Sheep | 7,259 |
> | "Hen | 8,278 |
>
> "It is difficult to house fowls so that they will have the same full advantage of fresh air as they have in the tree and at the same time be protected from draughts.
>
> "While a fowl can roost all night in a tree when it is blowing a gale and not take cold or suffer any other noticeable ill effects, it will take cold very quickly if compelled to be in a draught inside a house."

These points are mentioned in order to stress the great danger of overcrowding and the importance of fresh air.

Rearing Ducklings.

The same principles apply when rearing ducklings. They must have plenty of fresh air at night; in fact, they require more than chickens of the same age, and they require more animal feed in their rations than chickens.

Culling Pullets.

As only birds sound of body and of good constitution are likely to stand up to the strain of continued egg-production and prove profitable, it is advisable to cull all those not likely to measure up to requirements.

The most experienced and successful poultry-farmers get culls among their pullets, but their success is largely due to the fact that they are always on the watch and adopt a regular system of culling throughout the year. Any birds showing a weakness or stunted growth should be culled.

A tail carried with a downward slant, or what is known as a "dropped tail," indicates a weakness, and birds showing such a weakness are better removed. The beak should be examined, and if any are twisted or deformed the birds are not likely to be profitable. Birds with twisted backs or other deformity should be culled. If a bird is much thinner and narrower than the majority it indicates weakness.

Birds showing any bad breed defect are better out of the flock.

Above all, never keep the stunted stragglers, for they are a danger to any flock and often start an epidemic of colds, worms, or some other trouble.

—C. J. C. Cussen, Chief Poultry Instructor, Wellington.

N.Z. Federation of Young Farmers' Clubs.

Edited by S. Freeman, Dominion Organizing Secretary.

Poverty Bay Clubs' Sports Rally.

E. M. Bates, District Secretary, Gisborne.

THE Poverty Bay District Committee of the Young Farmers' Clubs held a combined sports rally, followed by a masquerade fancy dress ball, on 16th August. The Agricultural and Pastoral Association kindly lent the showgrounds for the rally, and in fine weather a very pleasant, if strenuous, day was spent. Competition was very keen throughout, and all events were closely contested.

The Wairoa Club was invited to compete, and won the Manawatu Challenge Cup for the most points in the meeting, gaining 30 points, with Gisborne a close second with 29 points, and Te Karaka third with 22 points.

Sports Results.

The sports programme was very comprehensive, and results were as follow :—

Football.—Seven seven-a-side teams competed. The Gisborne Club won the final after an exciting contest against the Wairoa Club.

Fig. 1.—The standing chop competition, which was won by the Ruatoria Club.

Tug-of-war.—The Wairoa Club defeated the Ruatoria Club, with the Gisborne Club third. Each team consisted of eight members.

Fig. 2.—Te Karaka Club players preparing to tackle a Wairoa Club player.

Standing Chop.—The Ruatoria Club took all the places because of the fine performances of J. A., G., and P. Brownlie.

Dog Trials.—In the head and pull event R. Pilmer and D. Buscke, both of Gisborne Club, tied for first place. S. J. Sinton, of Te Karaka, was third. In the drive and yard event the winners were : S. J. Sinton, Te Karaka, 1 ; B. H. Smith, Gisborne, 2 ; D. Buscke, Gisborne, 3. S. J. Sinton, Te Karaka Club, won the Brian S. Bree Cup for most points in the dog trials.

Sheaf-tossing Event.—J. Jackson, Te Karaka Club, 1 ; L. Donald, Tolaga Bay Club, 2 ; R. Field, Gisborne Club, 3. In this event the second and third placings tied, and in the throw-off actually threw the sheaf higher than the winner.

Running Events.

100 Yards Sprint Final.—J. E. Brownlie, Wairoa Club, 1; J. N. Brownlie, Wairoa Club, 2; M. Munro, Wairoa Club, 3.

220 Yards.—E. Newton, Te Karaka Club, 1; M. Munro, Wairoa Club, 2; M. Moore, Gisborne Club, 3.

440 Yards Relay.—Gisborne Club (R. McKinly, T. White, R. Field, M. Moore), 1; Wairoa Club (J. E. Brownlie, P. Lister, N. Munro, J. N. Brownlie), 2; Te Karaka Club (E. Newton, A. Bayley, A. Manuel, R. Jackson), 3.

Hop, Step, and Jump.—J. E. Brownlie, Wairoa Club, 1; J. Jackson, Te Karaka Club, 2; E. Newton, Te Karaka Club, 3.

100 Yards Open.—R. McKinly, Gisborne Club, 1; M. Moore, Gisborne Club, 2.

Sack Race.—A. Bayley, Te Karaka Club, 1; J. Lister, Gisborne Club, 2.

Fancy Dress Ball.

In the evening the masquerade fancy dress ball at the City Hall proved an outstanding success, and the Women's Division of the Farmers' Union cannot be praised too highly for their generous and willing help. The success of the rally was largely due to the interest and assistance of many others, including judges, referees, members, and their parents, and the generous donors of prizes.

Fig. 3.—An action photograph of the tug-o'-war—the Wairoa Club, which won the final by defeating the Ruatoria Club.

Mr. G. W. Smith, the District Chairman, presented the cups and prizes won by the competitors at the ball.

Other prizes awarded were: D. G. Beattie's prize for most efficient secretary, W. G. Brownlie, Wairoa Club; District Secretary's Shield for most efficient club in the Poverty Bay District, Gisborne Club

The day was marred by an accident to Mr. J. Bayley, Te Karaka, who received a broken leg in the first round of the football competition.

Inter-club Debate in the Wairarapa.

THERE was a good attendance of club members and friends in Pahiatua for the debate between members of the Ballance and Mangatainoka Clubs. The subject chosen was, "That the Young Farmer of To-day has More Opportunities than had his Grandfather in his Youth."

The teams were as follow: Ballance (negative), R. Day (leader), W. Holdaway, and H. Wilton; Mangatainoka (affirmative), I. Algie (leader), G. Cotter, and K. Pryde. Mr. J. W. Sturton, President of the Pahiatua Literary and Debating Society, presided, and Mr. J. A. Walsh acted as judge. The debate was judged on the following points: Deportment and effect, matter, delivery and argument, combativeness, enunciation and pronunciation.

At the conclusion of the debate Mr. Walsh gave the decision to the Mangatainoka team (affirmative), the points allotted being as follows: Mangatainoka, 225; Ballance, 213. The prize for the best speaker was awarded to H. Wilton (Ballance). The judge, in summing up, said Mr. Wilton spoke in a quiet, convincing, and logical manner; he never once hesitated for a word, and made little or no reference to notes. His enunciation was good, and his arguments solid.

The second best speaker was G. Cotter, who spoke surprisingly well and with considerable confidence, said the judge. He tackled his subject in a masterly manner, and adduced some sound reasonings, speaking with an entire absence of nervousness. The third best speaker was I. Algie, who spoke with excellent delivery, good style, and a very pleasing manner. He adduced the best arguments of the evening, but prejudiced his chances by glancing downwards at his notes too frequently, thereby losing touch with his audience.

The other three speakers were distinctly good, continued Mr. Walsh. The leader of the Ballance team, R. Day, the youngest of the debaters, had a bright, cheery style and a sense of humour, and showed great promise. Mr. Holdaway had a quiet delivery and spoke well, and should make a good debater. A little more vim and vigour in his speech would be helpful. Mr. K. Pryde, who had only a few minutes' notice to fill a vacant position, did exceedingly well, and required only a little more practice and confidence to make a good speaker.

The chairman congratulated the members of the two teams on the excellent speeches they had made. He also complimented the judge on his analysis of the various speeches and the helpful advice he had given the debaters. Mr. Graham Nutt, a past member of the Y.F.C. Dominion Executive, endorsed the chairman's remarks, stating that he, too, was agreeably surprised at the debating powers of the young speakers.

Votes of thanks to the chairman and the judge, proposed by W. Holdaway and I. Algie, brought a highly successful evening to a close.

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Southland Debating Contest.

W. Faithful, District Secretary, Gore.

THE final of a series of debates for the young farmers' clubs in Southland was decided in the R.S.A. Hall, Gore, on Friday evening, 7th October, when the finalists in the eastern and western districts competed for the W.D.F.U. trophy. The subject of the debate was "That Democracy has Failed."

The affirmative was taken by the Woodlands Y.F.C. team, representing the western districts, the members being Messrs. L. Middlemiss (leader), M. Clark, A. Campbell, and K. Hargest. Members of this team showed considerable preparation of their subject, and handled their matter in a businesslike manner.

The judge, Mr. E. H. W. Rowntree, Rector of the Gore High School, congratulated this team on the efficiency of its team work and its generally good delivery.

Although only a small margin of points separated the two teams, its treatment of the affirmative side of the debate gained Woodlands the winning place. Western Southland therefore holds the trophy for this year.

The Waikaka Club's team represented Eastern Southland in handling the negative side of the debate. The team consisted of Messrs. G. Gutschlag (leader), P. Turnbull, W. Kerse, and D. Kirkpatrick. This team stressed the undesirability of other forms of government, but failed to concentrate on the subject of democracy. Debates in the eastern district are a comparative innovation for the clubs, and this club is to be congratulated on the excellent showing it made on the debate.

Mr. S. D. Blomfield, vice-chairman of the Eastern Southland Executive Committee, presided over a large attendance. The chairman referred to the unfortunate accident which kept the chairman of the executive, Mr. Henry Smith, away from the debate. Although absent, Mr. Smith sent his best wishes to the meeting for a successful evening. The chairman also stressed the tremendous assistance the members of the W.D. and F.U. branches had been to the Young Farmers' Club movement, particularly in the district, and also throughout New Zealand. The desirability of forming more clubs in the district was mentioned, and all present were invited to co-operate in the work.

In presenting the trophy—a silver cup—Mrs. W. Orr, president of the Southland Executive of the W.D.F.U., congratulated the winning team, and expressed the hope that the movement would progress throughout the province.

Mr. A. R. Johnston, president of the Southland Provincial Executive of the Farmers' Union, also spoke of the value of the Young Farmers' Club movement.

Votes of thanks to the Women's Division for the trophy and for the excellent supper were carried by acclamation. The first was proposed by Mr. L. Middlemiss and seconded by Mr. E. Gutschlag, and the second was proposed by Mr. W. R. Harris, chairman of the Western Southland Executive of the Young Farmers' Club Committee. Mr. J. Middlemiss, president of the Woodlands Young Farmers' Club, proposed the vote of thanks to the judge.

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Manawatu Clubs' Debating Contest.

THE second round in the debating competition at present being conducted by the Manawatu Young Farmers' Clubs has now been completed, and some excellent debating was heard. The subject, "That the Embargo on the Direct Importation of Live-stock because of Foot-and-mouth Disease, should be Lifted," gave plenty of scope to both sides.

Levin defeated Otaki by a very small margin of points, Fitzherbert defeated Rongotea, Apiti defeated Kimbolton, and Colyton defeated Pohangina. Practically all the contests depended on the reply of the leaders for their result.

For the semi-finals the following subject has been chosen: "That All-grass Farming is More Profitable than a Combination of Grass and Cropping." Apiti will oppose Colyton, and Levin will oppose Fitzherbert. There is no doubt that this competition is bringing out a great deal of talent from the young farmers of this district, and a challenge debate against a team of young men from Palmerston North would be a fitting conclusion to the contests.

Dannevirke Club's Field-day.

J. W. PALMER, District Secretary, Hastings.

THE Dannevirke Young Farmers' Club held its field-day at Mr. G. J. Buchanan's property at Waitahora. Although weather conditions were far from ideal a large number of members attended, and the competition was keen in all sections. The working sheep-dog competition aroused keen interest, and under the conditions some very good runs were put up.

Messrs. C. J. and R. J. Wiffen acted as judges, the results being: D. MacDonald's (Dannevirke), "Lad," 1; Tom Morrison's (Makotuku) "Tuff," 2; L. Bedford's (Motea) "Fanny," 3; G. N. Buchanan's (Waitahora), "Dan," 4.

At the conclusion of this competition the judges gave exhibition trial runs, which were greatly appreciated by members.

Fig. 1.—Members of the Dannevirke Club who attended the club's first field-day, which comprised dog trials and judging of Southdowns and Romney sheep, on Mr. G. J. J. Buchanan's property at Waitahora, Dannevirke.

[J. W. Palmer, photo.

Sheep-judging Competitions.

Seventeen entries were received in both the Romney and Southdown classes. Competitors were asked to place four ewe hoggets, giving their reasons and any faults. Unfortunately, it was impossible for the judges selected to be present, and at the request of the club, Mr. G. J. J. Buchanan agreed to act. When the members had completed their judging Mr. Buchanan placed the sheep, giving his reasons.

The following are the results:—

ROMNEYS.

L. Tickner (15), Waitahora, 1; T. Nicholson (7), Mangatoro, 2; F. Tickner (16), Waitahora, 3; J. Harvey, jun. (9), Waitahora, 4.

Judge's Comments.

The judge said that Nos. 15 and 7 both placed the sheep in the Romney ewe hogget class correctly, but could have gone into more detail. No. 16 was a good paper and placed the first two hoggets correctly, but went astray on the third and fourth sheep. This card is worth special mention, as the person putting it in made his remarks very fully and to the point. No. 9 placed the first two hoggets correctly, but also went astray on the other two. This paper was also lacking in detail.

SOUTHDOWNS.

J. L. Stuckey (6), Awariki, 1; F. Tickner (16), Waitahora, 2; T. Nicholson (7), Waitahora, 3; W. Robinson (13), Mangahei, 4.

Judge's Comments.

The judge said that No. 6 placed hoggets correctly. It was a good paper, but could have gone into a bit more detail on the third and fourth placings. No. 16 placed the first hogget correctly, but went astray with the three remaining sheep. It was a very good paper, and attention to detail was displayed in a particularly good style. No. 7 placed the first hogget correctly, but missed in the remaining three sheep. It was a fair card, but more detail could be shown.

At the conclusion, Mr. T. P. Blyth, chairman of the Dannevirke Young Farmers' Club, thanked Mr. Buchanan for allowing the field-day to be held on his property, for the special prizes donated to the sheep classes, and for his keen interest in the club. Mrs. Buchanan was also heartily thanked for supplying afternoon tea. In his reply, Mr. Buchanan wished the club every success in the future, and stated that he would do all he could to help them.

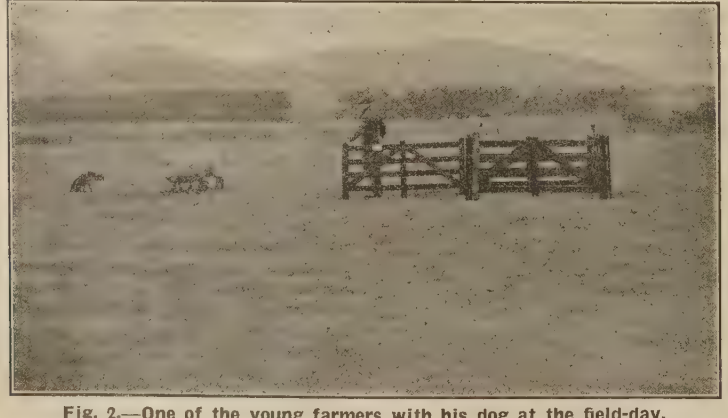

Fig. 2.—One of the young farmers with his dog at the field-day.

[J. W. Palmer, photo.

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Ashburton County Club's Field-day.

V. P. Boot, District Secretary, Ashburton.

A FIELD-DAY arranged by the Ashburton District Committee of Young Farmers' Clubs was held at the Ashburton Showgrounds on Friday, 21st October. There was an excellent attendance of young farmers and also some senior farmers.

The field-day took the form of demonstrations on sheep and cattle, each of the demonstrators dealing very fully with the points of their respective breeds.

The following breeders kindly made their services available to the young farmers: Mr. R. J. Low, of Highbank, who demonstrated on the English Leicester breed; Mr. H. C. B. Withell, of Ealing, who demonstrated on the Ryeland breed; and Mr. G. H. B. Lill, of Eiffelton, who demonstrated on the Milking Shorthorn.

Each demonstrator dealt fully with the points looked for by a competent judge in the show ring, and it was pleasing to the committee to see notes being made and to hear the manner in which questions were put to the breeders.

At the conclusion of each demonstration a member of a club proposed a vote of thanks to the demonstrator. Mr. L. Chisnall, Advisory President of the Hinds District Young Farmers' Club, proposed a general vote of thanks to those responsible for making the day such a marked success.

Mr. R. J. Low demonstrating on English Leicester sheep at the field-day of the Ashburton County young farmers' clubs.

An enjoyable afternoon concluded with the holding of a stock-judging competition on English Leicester ewe hoggets. The excellent results of this competition showed that the knowledge imparted by the demonstrators had been used to advantage.

On the Tasman Glacier.

G. Crump, Lawrence Club.

AMONG a party of about thirty tourists who set out from Mount Cook Hermitage, equipped with tramping boots, sun goggles, and staves, to spend a day on the Tasman Glacier was a young fellow farmer and myself. It was about the middle of January. There was not a cloud in the sky, and the prospects for a perfect day were very promising.

After travelling thirteen miles in a rickety old bus over the roughest road imaginable, which, for the most part, was across the moraine of the Tasman Glacier, we came to the Ball Hut.

Arrival at Ball Hut.

The Ball Hut is situated on the banks of the Tasman Glacier, and commands a magnificent view of the glacier and surrounding mountains. The Ball Hut is more a miniature hotel than a hut. It is a corrugated-iron structure of two stories, having, I should think, about ten rooms and accommodation for up to one hundred people. The journey had taken us two hours, rocking, bumping, and lurching at the rate of about six miles an hour over little less than a field of boulders, and on alighting from the bus we felt rather stiff and sore. However, we soon wore this off as we climbed the winding track to the hut, where, after a short wait, lunch was served.

After lunch we were divided into two groups, with a guide for each group, and then started off for a tramp across the glacier. After clambering down a zig-zag path cut out of a steep bank about 50 ft. high we arrived at the edge of the glacier. The surface of the glacier is by no means smooth; the ice is raised in mounds about 4 ft. or 5 ft. high, some higher, others lower, making thousands of little gutters or gullies.

Travelling on the Ice.

For the first quarter of a mile the ice was practically covered with a thin coating of small, grey stones, but as we tramped farther on these disappeared except for a few boulders, leaving a huge field of glittering, sparkling-white ice, from which the midsummer sun, now at its meridian, glared pitilessly, making it necessary for us to don our coloured goggles.

Our guide pointed out many of the mountain peaks and other landmarks—Mount Tasman, Glacier Cone, and the

Graham Saddle being among those pointed out. Distance is very deceiving in alpine regions. Different landmarks which seemed to me to be no more than a quarter of a mile away were, I was told, actually four or five miles distant.

We passed quite a number of crevasses, both large and small. Our guide threw a boulder into a particularly large crevass and told us to listen to it hit the bottom. Breathlessly we waited, and after what seemed an age we could distinctly hear the sound echoing from the murky depths. We threw in another boulder and timed it, and it took seven seconds after leaving the surface to strike the bottom.

Our guide took us to a spot where a small cave had formed in the ice. Inside the cave the ice was a wonderful light-blue colour, and in places almost green. We were told that where the ice was coloured there was most movement in the glacier. The Tasman Glacier moves at the rate of from 9 in. to 18 in. a day, and is fed from 250,000 acres of snow.

Rumblings of Avalanche.

We heard several distant rumblings which, our guide told us, were made by avalanches. We even saw one of these, but at so great a distance that it looked like a square yard of snow moving a few feet down the face of the mountain.

We began our return journey at a spot directly opposite the Hooker Snow Falls, of which we had a magnificent view—in fact it looked so close that I was tempted to set out and walk what seemed to be about 2 chains to the foot of the falls, but I was told it was at least three miles away.

We hurried on our homeward tramp, arriving at the Ball Hut at about 4 p.m., where our hunger was satisfied by a very pleasing meal. After this we climbed aboard the bus on the last lap of the journey back to the Mount Cook Hermitage, leaving behind us the Tasman Glacier, but taking with us many happy and pleasant memories.

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PROSPECTUS.

A prospectus giving all details may be obtained from the Director of the Fields Division, Department of Agriculture, Wellington, or from the Manager, Ruakura Farm of Instruction, Hamilton.

FEES.

The fee for each term of tuition and board (including soft washing) is £18. All fees are payable in advance. Students leaving before the end of their course are required to give three months' notice. Stationery is supplied at wholesale prices.

ADMISSION OF STUDENTS.

The course of instruction is open to lads of not less than sixteen years of age and of reasonable educational attainments.

Applications for admission should be submitted as early as possible.

Among the Clubs: Reports on Activities.

Southland.

Otama.—Club debate, the subject being "That Tractors are Superior to Horses for Farm Work." The affirmative was taken by S. Mackay, C. White, L. Mackay, and J. White, and the negative by W. Logan, B. Wilson, A. Dillon, and J. Brand. Mr. Kelly, of Wendon, acted as Judge, and gave the award to the affirmative side.

Wyndham.—Arrangements for shearing competition and final of debating contest. Lecture by Mr. W. R. Harris on "Pasture Management and Root Crops."

Dunedin.

Middlemarch.—Discussion on proposal of Mr. A. W. Duncan, of the local district high school, to establish a series of experimental plots. Mr. Duncan outlined the scheme, and stated that the main object was to experiment with and demonstrate the value of different manures on mangels. He hoped that members of the Young Farmers' Club would take an interest in these plots, and stated that he would be glad to assist when possible with demonstrations. Mr. S. H. Saxby, Department of Agriculture, then gave a brief outline of experimental and research work, describing the objects of research and mentioning the vast number of persons engaged in it throughout the world. So far as farm research was concerned, he said, the greatest number of research workers were the farmers themselves. Every farmer who was at all progressive was, in reality, a research worker in many spheres of farming activity. So far as the school plots were concerned, Mr. Saxby considered that, with proper attention, some valuable results should be obtained, and that the young farmers of the district should be glad to avail themselves of the opportunities offered by Mr. Duncan. He pointed out that the results from any experiment were specific for that trial only, but that as a guide they could be extremely valuable. Mr. Lobb, Department of Agriculture, congratulated Mr. Duncan on the thoroughness with which he intended to carry out the trials. He expressed agreement with Mr. Duncan in his intention not only to estimate total yields, but also to make determinations of the relative dry matter. At the conclusion of the discussion Mr. Glover moved a vote of thanks to the various speakers.

North Otago.

Enfield.—Brief outline given of the increase in the club membership subscription; dance postponed; decided to hold a rope-splicing contest at the next meeting. Talk by Mr. J. Simpson on "Farm Finance." Mr. T. A. Sellwood, Department of Agriculture, discussed the question of "Suitable Grasses for Pastures."

Five Forks.—Lantern lecture by Mr. D. Wraight, of Timaru, on "The Manufacture of Superphosphate."

Tokarahi.—Lecture by Mr. T. A. Sellwood, Department of Agriculture, on "The Mangel Crop."

Waitaki-Hilderthorpe.—Lecture by Mr. S. Hook, Meat Inspector, Pukeuri Freezing-works, on "Stock Diseases and Conditions Found at Freezing-works." At the previous meeting an interesting talk on "Stock Ailments" was given by Mr. A. Ingram, Inspector of Stock, Oamaru.

South Canterbury.

Arno.—Instructive lecture on "Hydatids" by Dr. R. G. Shackleton.

Geraldine.—Arrangements for a "wind-up" dance. Inter-club debate, Pleasant Point *v.* Geraldine, the subject being "That Mixed Farming offers More Monetary Return than Sheep-farming on the Plains Land." Pleasant Point took the affirmative, and were adjudged the winners. The speakers were—Pleasant Point: V. Wilson, O. Chapman, and H. Talbot; Geraldine: H. Worner, D. Chisnall, and C. Burrows. The debate was strictly impromptu, the subject being sent to the meeting in a sealed envelope. Mr. C. C. Leitch, Department of Agriculture, acted as judge. At the previous meeting an interesting talk entitled "The Boer War and South Africa" was given by Canon A. H. Norris. The speaker described his own experiences, and answered a number of questions about the agricultural pursuits in South Africa.

Maungati.—Arrangements for social. Lecture by Mr. E. J. Lukey, Government Veterinarian, on "The Care of the Breeding-ewe." At the previous meeting prepared speeches were given by members.

Milford.—Lecture by Mr. C. C. Leitch, Department of Agriculture, on "Grasses and Clovers." Discussion *re* field-day and proposed North Island tour.

Pleasant Point.—Arrangements for a field-day, and also for a debate. Two "movie" films exhibited by Mr. C. C. Leitch, Department of Agriculture, one depicting Maori life, and the other entitled "Our Daily Bread," dealing with the wheat industry. At the previous meeting a debate was held, the subject being "That the Young Farmer of To-day has better Opportunities than his Grandfather." The speakers were—affirmative: F. R. Clarke and A. Crombie; negative: E. B. Chapman and D. R. Shires. The award was given to the negative. Members of the Pleasant Point Farmers' Union acted as judges. Some very helpful criticism was given by Messrs. A. B. Struthers and B. E. Elphick.

Waihaorunga.—Debates held as follows: Waihaorunga *v.* Arno, subjects, "That the Emancipation of Women has been in the Interests of Society," and "Does Farming Offer as Good Opportunities as other Avenues of Employment." Waihaorunga (negative) won the first debate, and Arno (negative) won the second. Further debates, Waihaorunga *v.* Hunter, subject "That Secondary Industries should be encouraged in New Zealand," won by Waihaorunga (negative); Womens' Institute *v.* Waihaorunga, subject "That the Women should be the Mistress of the House," won by the Womens' Institute, who took the negative.

Mid-Canterbury.

Ashburton.—Lantern lecture by Mr. R. McGillivray, Fields Superintendent, Department of Agriculture, on "Pastures, and Strains of Grasses and Clovers."

Hinds.—Lecture by Mr. W. Stafford, Department of Agriculture, on "Irrigation."

Mayfield.—Debate, the subject being "That the Settler on the Land To-day has Greater Possibilities of Success than the Settler in the Past. Speakers—Affirmative: W. L. Doyle, G. Branch, and K. Moore; negative: S. Sewell, A. McLay, and R. M. Mulligan. The team supporting the negative won by a narrow margin. The judge was Mr. J. W. Kingan.

Methven.—Discussion *re* stock-judging and shearing competitions. A "prepared speech" competition was held, for which Mr. R. Dunkley, president of the Methven Farmers' Union, presented a handsome challenge cup, and Mr. R. Gerard a trophy for the runner-up. The subjects selected by Mr. Dunkley were as follows: (*a*) "The Uses and Possibilities of Electricity on the Farm"; (*b*) "The Menace to the Farming Community from Synthetic Products"; (*c*) "The Advantages and Disadvantages of Agricultural and Pastoral Shows to the Practical Farmer." Mr. R. J. Low, the Club Advisory President, controlled the competition. Eight members took part, and the judge, Mr. L. Aitken, who gave some very constructive criticism, placed the first four as follows (possible marks, 210): J. Vallance, 160 points, 1; R. Penny, 153 points, 2; R. Wightman, 139 points, 3; C. Wightman, 136 points, 4. In presenting the trophies, Mr. Dunkley congratulated the speakers on their fine performances, and said that he felt more than justified in donating the challenge cup in an endeavour to improve the standard of public speaking.

Christchurch.

Darfield.—Arrangements for field-day and dance. One member to compete in National Sheep-shearing Competition at Palmerston North. Lecture by Mr. Hannah, of Lincoln College, on "The Care and Management of Stud Sheep."

Ellesmere.—Two teams selected to compete in the stock-judging competitions at the Christchurch Agricultural and Pastoral Show. Address by Mr. H. G. Stephens on his "Tour of Australia."

Hororata.—Talk by Mr. S. Freeman, Dominion Organizing Secretary, on the Y.F.C. Movement and club work generally. Mr. Freeman also exhibited some "talkie" films of agricultural and general interest.

Little River.—General business. Invitation accepted from the Lyttelton Harbour Board to take part in an educational day at Lyttelton.

Teddington.—Arrangements for dance. Interesting travel talk by Dr. Burns.

North Canterbury.

Amberley.—Team selected for stock-judging competition at the Christchurch Agricultural and Pastoral Show. Lecture by Mr. Marsh on "Wheat and Flour-milling."

Amuri.—Lecture by Mr. C. K. L. Knott, Government Veterinarian, on "The Management of Breeding-ewes at Lambing-time."

Cust.—Arrangements for Y.F.C. exhibit at Rangiora Agricultural and Pastoral Show. Team selected for judging competition at Christchurch Show. Lecture by Dr. M. M. Burns, of Lincoln College, on "Liming the Land for Profit."

Oxford.—Address by Mr. F. Englebrecht on his tour of Australia.

Scargill - Omihi. — Arrangements for field - day. Lieut.-Colonel Nicoll exhibited films dealing with the activities of the C.Y.C., and gave an address on 'Defence Problems."

Marlborough.

The Dominion Organizing Secretary, Mr. S. Freeman, paid visits to the Blenheim, Flaxbourne, and Seddon clubs. He exhibited "talkie" films dealing with agricultural subjects, and gave an address on the Y.F.C. movement at each meeting.

Nelson.

Dovedale.—Arrangements for Y.F.C. stock-judging at the Nelson Agricultural and Pastoral Show. Address by Mr. T. H. Robinson on "Insurance." The meeting was attended by members of the local Farmers' Union.

Wairarapa.

Alfredton.—Lecture by Mr. Taviner on "Agriculture and Other Subjects of Interest in Rarotonga."

Ballance.—Lantern lecture by Mr. J. E. Duncan, Department of Agriculture, on "Wool." The meeting was held in Pahiatua, in conjunction with other clubs in the Bush District.

Carterton.—Report by Mr. D. McGregor on the annual general meeting of the Federation. Arrangements for table tennis match with Masterton Club. Lecture by Mr. W. J. Gray, Government Veterinarian, on "Stock Diseases." Mr. Gray dealt with facial eczema, milk-fever, grass staggers, mammitis, foot-rot, and sleepy sickness.

Pongaroa.—Lantern lecture by Mr. J. E. Duncan, Department of Agriculture, on "Wool."

Tinui.—The club secretary's report is as follows: "The monthly meeting of the Tinui Y.F.C. was held on the 6th instant, Mr. J. Groves presiding. A lantern lecture on the practical side of woolgrowing was given by Mr. J. E. Duncan, Wool Instructor, Department of Agriculture. He dealt first with the various types of fibres, showing some common faults, and stressed strongly the undesirability of hairiness. Mr. Duncan described a simple test, using the benzol process, in order to facilitate the improvement of the fleece. He emphasized the menace to woolgrowers of artificial wools made from casein and wood-pulp. This wool had, he said, the advantage of being produced to a standard; therefore the farmer must produce as near as possible an even-quality fleece. Mr. Duncan also demonstrated the damage caused by the indiscriminate use of tar brands, and dealt with the different bacterial infections of the fleece caused by faulty fleecing of the back, allowing water to penetrate. After answering questions, Mr. Duncan was accorded a hearty vote of thanks."

Manawatu.

Apiti.—Discussion *re* shearing competition; arrangements made for members to have a "trial" shearing-day, an expert local shearer to be in attendance as a coach. Lecture by Mr. Jamieson on "Crops and Cropping."

Bunnythorpe.—Lecture by Mr. B. McLeod, Colyton, on "Mole Drainage." At a previous meeting a debate was held, the subject being "That Farming is More Difficult To-day than it was Fifty Years Ago." The following members took part—Affirmative: Messrs. Anderson, Wood, and James; negative: Messrs. Stewart, McKenzie, and Rowan.

Colyton.—Discussion on wool and shearing competitions at the Palmerston North Show and also on a local field-day.

Feilding.—Report on dance; address by Mr. Buist on "Public Speaking."

Fitzherbert.—Discussion *re* forthcoming debate between Apiti and Fitzherbert clubs; film showing caterpillar tractors exhibited by Mr. Kidd.

Halcombe.—Interesting address entitled "Agriculture Abroad" by Mr. L. J. Wild, principal of Feilding Agricultural High School.

Kairanga.—Arrangements *re* fat-lamb exhibits at Palmerston North Agricultural and Pastoral Show; lecture by Mr. H. Lancaster on "Dairy-farm Management."

Kimbolton-Kiwitea.—Reports on dance and inter-club debate. Address by Mr. E. W. Barnett, of Halcombe, on "Shearing and the Shearing Competition at the Palmerston North Show."

Levin.—Invitation accepted from Junior Division, W.D.F.U., to attend a social evening; further arrangements for judging competition. Mr. E. W. Barnett, of Halcombe, demonstrated with the aid of lantern slides the correct method of handling and shearing sheep.

Pohangina Valley.—Discussion *re* classes at the Manawatu Spring Show. Lecture by Mr. C. S. Robinson, Department of Agriculture, on "Top-dressing."

Rangiotu.—Discussion *re* debating competition. Mr. H. R. Denize, Inspector of Stock, gave a demonstration of the brom-thymol test and a lantern lecture on "Animal Husbandry." At the previous meeting a debate was held with members of the Rongotea Club, the subject being "That Farming To-day is Harder than Fifty Years Ago." The speakers were as follows—Rongotea (negative): J. W. Gloyn, J. T. Quarry, T. H. Gibbons; Rangiotu (affirmative): R. Bond, K. Wilton, S. H. Lucas. The verdict was given to the Rongotea team.

Rangiwahia.—Discussion *re* shearing competition at Palmerston North Show, &c.

Rongotea.—A debate, Kairanga *v.* Rongotea, was won by Rongotea.

Shannon.—Talk by Mr. G. Thomas, of Messrs. Abraham and Williams, on "The Drafting of Fat-lambs." The speaker dealt fully with his subject, explaining, among other things, "buying on schedule" and "selling at per head."

Waituna.—Lantern lecture by Mr. E. W. Barnett, of Halcombe, on "Shearing."

Wanganui.

Hunterville.—Talk on "Lambing" by Mr. W. H. Morton. At meetings previously unreported debates were held as follows: *v.* Bulls Y.F.C., subject "Grassland *v.* Supplementary Cropping," won by Bulls; *v.* Junior Division of W.D.F.U., subject "Town *v.* Country," won by the Junior Division. A lecture on "Insurance" was also given by Mr. Featon.

Marton.—Arrangements for district field-day. Mr. S. Laurenson outlined the art of debating, after which a general debate was held, the subject being "That Straight-out Grass Farming is Superior to Supplementary Cropping."

Taihape.—Lantern lecture by Mr. E. Bruce Levy, Director of the Grasslands Division, Plant Research Bureau, on "Impressions of Agriculture Overseas." A field-day was held on Mr. L. A. P. Sherriff's property, Koiwhiwhi. Mr. Sherriff demonstrated on his Aberdeen Angus cattle, after which a judging competition was held. There was an attendance of 36.

Westmere.—Discussion *re* stock-judging competition at Royal Show, Hamilton, and shearing competition at Palmerston North Show. Members advised to enter pens of lambs in the Y.F.C. class at the Wanganui Agricultural and Pastoral Show, and also to offer their services as stewards. Mr. A. R. Dingwall, Department of Agriculture, detailed arrangements in connection with a field-day and stock-judging competition to be held at Marton. Mr. C. Goldstone, a club member, gave an interesting talk on "Wheat-growing and Crop Rotation in Canterbury."

South Taranaki.

Alton.—Arrangements in connection with Y.F.C. rally at Hawera. Social evening followed meeting.

Eltham.—Invitation from Farmers' Union for members to attend pasture-judging. Arrangements for debate with Pukengahu Club. Impromptu speeches by members on various farming topics; some very good speeches resulted. At the previous meeting Mr. J. E. Davies, Department of Agriculture, gave a lecture on "Pasture Management."

Hawera.—Arrangements for field-day. Discussion on a report entitled "Land Settlement" prepared by W. Phillips, a club member. At the previous meeting a lecture was given by Mr. J. E. Davies, Department of Agriculture, on "Seed Certification and its Value in the Establishment of Good Pastures."

Kaponga.—Arrangements for a visit to a dairy-farm for a demonstration on dairy stock. Club debate, the subject being "That Dairy Farming is more Profitable than Sheep-farming." The speakers were M. Kissick and K. Rowe (affirmative), and R. Edgecombe and E. Duff (negative). The supporters of the affirmative were declared the winners.

Pukengahu.—Arrangements finalized for two field-days, one on dairy stock and one on pigs. A debate was held with members of the Eltham Club, the subject being "That Dairy-farmers should Test their Herds under the Dominion Group Herd-testing Association." The debate was very closely contested, and resulted in a win for the Pukengahu Club, whose team spoke for the affirmative, by the narrow margin of 77 points to 76. The judges were Messrs. F. Mertons and H. D. Lambie, Advisory Presidents of the Pukengahu and Eltham Clubs respectively. A field-day was held by the Pukengahu Club on Mr. Best's farm, the owner demonstrating on Romney and Southdown sheep.

North Taranaki.

Cardiff.—Arrangements for field-day and stock-judging competition; invitation to be sent to members of Pukengahu Club. Address by Mr. G. Court, of the Kaponga Farmers' Union, on "Sheep for the Dairy Farmer." At the previous meeting a talk was given by Mr. C. H. M. Sorensen, Pig Club Supervisor, on "The Importance and Value of Pig Recording Clubs."

Karawaka.—Arrangements for a dance and euchre party. All members present took part in a debate "Hay and Ensilage *v.* Hay and Roots." Mr. J. N Blyde, Advisory President, acted as judge. The side supporting "Hay and Ensilage" won by a small margin.

Okau-Tongaporutu.—Short addresses by club members as follows: "Marking Lambs" (E. Foreman); "Breaking-in Fern Country" (R. O'Donell); "Diseases in Lambs" (G. O'Donell); "Feed Flavour" (O. Collins); "Farming in Rhodesia" (M. Collins). Club members attended a meeting of the Farmers' Union to hear Mr. C. H. M. Sorensen, Pig Club Supervisor, in connection with the forming of a pig-recording club. One of the club members was appointed to the selection committee of the newly-formed Pig Club.

Toko.—Three teams selected for stock-judging competitions at the Stratford Agricultural and Pastoral Show. Address by Mr. Marfell on his experiences in the Great War. At the previous meeting a film dealing with caterpillar tractors was exhibited.

Southern Hawke's Bay.

Dannevirke.—A large gathering organized by the Y.F.C. visited the Dannevirke High School, where an exhibition of farming interest had been prepared. Demonstrations were given of the various scientific tests used in agriculture, including the brom-thymol test for mammitis and the benzol test for hairiness in wool. The visitors also saw the work of the agriculture class at the school, the co-ordination of the theory and practice being explained. A post-mortem examination of a diseased sheep was carried out by Mr. S. K. Carswell, Agriculture Master at the High School.

Norsewood.—Decided to support the Dannevirke Club in connection with a suggested bacon competition. Lecture by Mr. W. Jenkins on "Farming Conditions in England."

Onga Onga.—Club debate, subject "That Grassland Farming is Better than Arable Farming," the speakers being as follows: O. Bloomfield and C. N. Masters (affirmative), L. E. Bradley and E. S. Bibby (negative).

Takapau.—Lecture by Mr. G. V. Westbrooke, Government Apiary Instructor, on "Bees."

Northern Hawke's Bay.

Meeanee.—Discussion *re* proposed club sports meeting, to include athletic, horse and novelty events, chopping and sawing, and also stock-judging, &c. Lecture on "Bacon Curing" by C. Oliver (a club member). The speaker dealt with the feeding to produce the best bacon, the killing of the pig, and the cutting-up of the carcass, and the curing and smoking. He also gave details of two proved cures.

Nuhaka.—Field-day on Mr. T. W. G. Tombleson's property. Mr. Tombleson demonstrated on his Polled Hereford cattle.

Putorino.—Address on "Fleece Testing" by Mr. M. Johnstone, followed by a demonstration of the benzol test. Address by Mr. E. Wills on "Pasture Grasses."

Poverty Bay.

Te Karaka.—Discussion *re* shearing competition. Address by Mr. G. Brown on "The Value of Keeping Farm Records."

Tolaga Bay.—Talks by club members as follows: "How to Speak in a Debate" (K. Cooper); "The Origin of the Present Breed of Horses" (J. Phillips); "How to Sell Bits and Pieces of Wool" (R. Nelson).

Waiapu.—Addresses by Messrs. J. Morrissey and D. Kirkham on "Oil Tankers" and "A Trip around the Islands" respectively.

Te Kuiti.

Aria.—Club debate, "That the Young Farmer of To-day has Greater Opportunities than his Grandfather," the speakers being R. Thomas and D. Scrivener (negative), R. Pritchard and E. Riddle (affirmative). A field-day was held on Messrs. Alderson Bros.' farm; Mr. T. Alderson showed members around the farm, pointing out the changes that had taken place since it was first occupied.

Otorohanga.—Lantern lecture by Mr. E. Bruce Levy, Director of the Grasslands Division, Plant Research Bureau, on "Impressions of Agriculture Overseas." Recent field-days have included a visit to Messrs. Tipping Bros.' farm, a visit to the Horotiu Freezing-works, and a visit to Mr. Merrin's dairy, where a lecture on "Modern Pasteurizing of Milk" was given by Mr. E. A. Merrin.

Te Anga Central.—A lecture on "Calving Troubles" was given by Mr. W. G. Bonner, Inspector of Stock.

A football match was played between the Otorohanga and Te Anga Clubs, resulting in a win for the Otorohanga team by 19 points to 6.

Rotorua.

Horohoro.—A successful ploughing match was held on Mr. T. Waerea's farm. Sixteen local members and one visiting member competed in the three classes, (*a*) single furrow (short) one wheel only; (*b*) single furrow (long); (*c*) double furrow. Special prizes were awarded for best strike, best finish in each class, and best on the ground, and also for best "ins and outs" on ground, best plough team, the best-groomed team, and the best-handled team, together with prizes for the best-kept harness, the straightest ploughing on the ground, and for the champion ploughman. Mr. E. W. R. Leslie acted as judge of the ploughing, and Mr. Harrington, of Tokoroa, of the horse and harness, &c. There was an attendance of 115, in spite of a cold, showery day. An enjoyable social was held in the evening, during which a short debate took place, the subject being "The Long Mouldboard Plough *v.* the Short Mouldboard Plough." There were four speakers on each side, two members of the Rotorua-Ngongotaha Club and two members of the Ngakura Club speaking in favour of the long mouldboard, and four members of the Horohoro Club supporting the short mouldboard. The subject was keenly debated, the Horohoro team being declared the winners.

Rotorua-Ngongotaha.—Address by Mr. Leask on "Management and Cleanliness in Cow-sheds." At meetings previously unreported the following addresses were given: "The Management and Care of Fat Stock" (Mr. McLennan); "General Management and Care of Sheep" (Mr. C. Gillam); "How to Rear Calves up to Weaning State" (Mr. J. Boulcott); "Management of Breeding-ewes on the Dairy-farm" (Mr. H. M. Martin).

Eastern Bay of Plenty.

Opotiki.—Arrangements for a field-day at Mr. Beattie's piggeries.

Waimana.—Lecture on "The Pig Industry" by Mr. H. M. Peirsen, Extension Officer in Pig Husbandry, Department of Agriculture.

Western Bay of Plenty.

Katikati.—Discussion *re* stock-judging at Royal Show, Hamilton. Lecture by Mr. A. V. Allo, Department of Agriculture, on "Manures and Top-dressing."

Omokoroa.—Lantern lecture by Mr. A. V. Allo, Department of Agriculture, on "Seed Certification."

Tauranga.—Discussion *re* inter-club tennis and cricket; lecture by Mr. A. V. Allo, Department of Agriculture, on "Top-dressing."

Te Puke.—Lecture by Mr. G. Broom, Government Veterinarian, on "Diseases of Horses' Feet."

Waikato.

Huntley West.—Arrangements for dance. Debate, "Horses *v.* Tractors," between two club members, J. Frandi (horses) and K. Johnson (tractors); the debate was won by K. Johnson. An address was given by Mr. J. H. Furniss on "Leadership."

Kakepuku.—Discussion *re* Royal Show, Hamilton. Arrangements for a debate. Lantern lecture by Mr. C. Walker, Department of Agriculture, on "The Development of Pumice Lands." A field-day was held on Messrs. Candy Bros. property, Pokuru. Mr. G. B. Melrose gave an address and demonstration on "Stock Ailments," and a talk on "The Care of Young Calves," stressing the necessity for correct feeding and adequate shelter.

Te Kowhai.—Club debate, subject "Grassland Farming *v.* Supplementary Feeding," the speakers being (grassland) C. H. Weedon, E. G. Radford, and A. Hope; (supplementary feeding) R. Banwell, J. Truelove, and F. Couch. The supporters of supplementary feeding won by a narrow margin. A field-day was held on the property of Messrs. Corby Bros., Te Kowhai. Demonstrations included "Sheep," by Mr. S. Potts, Cambridge, and "Horses," by Mr. J. C. Begbie, Te Kowhai. The attendance was twenty-five, including visitors.

North Auckland.

Marohemo.—Discussion *re* stock-judging at the Royal Show, Hamilton. Lecture by Mr. King, Department of Agriculture, Kenya Colony, on "General Farming." A field-day was held on the property of Mr. M. Mares; a demonstration of the sterilization of the milking-plant was given by Mr. King.

Ruawai.—Lecture by Mr. W. A. Beattie, Pig Recording Officer, on "Mineral Deficiency in Pigs," dealing with the symptoms and practical cures.

Umawera.—Lecture by Mr. W. A. Beattie, Pig Recording Officer, on "Pigs." Mr. Beattie dealt with the regulating of litters in accordance with the milk-supply in order to eliminate the wintering of any stores. He described the best pig from the butcher's point of view, and showed how a deficiency of minerals (limes, phosphates, &c.) influenced bone-formation. Methods of feeding were also discussed. At the previous meeting Mr. G. Cameron addressed the members on "Farming Problems of the District." This is a new club with very good prospects.

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Health Notes for the Farm.

Contributed by the Department of Health.

Nursing the Sick in the Home.

"Nursing is putting the best possible conditions for Nature to restore or to preserve health, to prevent or cure disease or injury. Health is not only to be well, but to be able to use well every power we have to use. Sickness or disease is Nature's way of getting rid of the effects of conditions which have interfered with health. It is Nature's attempt to cure—we have to help her. Partly, perhaps mainly, upon nursing must depend whether Nature succeeds or fails in her attempt to cure by sickness. Nursing is therefore to help the patient to live."

SUCH are the words of Florence Nightingale written fifty years ago in an article on nursing the sick. In the interests of the well-being of the family a knowledge by women of the principles of nursing is of vital importance. Sooner or later sickness occurs in the home, and if one has a sound general knowledge of nursing, particularly in the country where often it is difficult or impossible to secure immediate medical or nursing services, measures can be taken to protect the family from disease and, in the words of Florence Nightingale, "to help the patient to live."

In any case, a sound knowledge of nursing is a great asset to every woman and broadens and increases her sphere of usefulness throughout life. One comes across many examples of this where a nurse has married and settled down in a country district.

Prevention.

First of all it might be stressed that to be happy and successful we must keep well, and that many of the premature ills to which the flesh is heir to can be prevented if we only take care in time. In connection with prevention, Father Time will, as a rule, touch lightly the active person. Prevention lies in well-balanced activity of mind and body. Another important means of prevention of serious illness is proper advice at the beginning. This should be obtained from the family doctor.

If the patient is to be kept in bed some people will contemplate the removal of the sick one to hospital because it is upsetting to the household. In some cases this is the better plan, particularly if the illness is going to mean surgical interference, but there are occasions on which those who are ill can be cared for in their own homes by their own people and among their own surroundings, provided this care is directed by expert advice.

The Nurse.

The nurse should possess three qualities —reliability, self-control, and a high standard of personal hygiene. Through her reliability the doctor's orders will be strictly followed, by her self-control she will inspire in the patient confidence in her administrations, and by cleanliness in every detail of her work and person she will help the patient and protect herself and others from infection.

In this last connection, when nursing or attending to any patient the nurse must carefully wash and scrub her own hands, because neglect to do this is one of the most direct ways of conveying infection.

The Room.

The room should be clean, and the floor coverings should be such that they can be swept without dust flying. An attractive room helps to keep the patient interested. So many people still think it necessary to close, more or less, the windows of the sick room. Plenty of fresh air, sunlight, brightness, and cheerfulness are what are wanted, with blinds for shade when needed.

The majority of illnesses respond more quickly if the patient is quite in the open air. Florence Nightingale states that the very first canon of nursing is to keep the air inside as fresh as the air outside, by night as well as by day, without chilling the patient. When the patient is old and perhaps a chronic invalid it is important to keep an even temperature in the room.

The Bed.

The bed should be placed in the best position to secure air without draught, light without glare, quiet, and cleanliness. This may necessitate rearrangement of the furniture of the whole room. A single bed made with the bottom sheet well turned in at the top of the mattress to prevent ridges, warm, light bed-clothes, and plenty of pillows so that the patient may be completely supported are needed. One of the greatest comforts to any one lying on his back is the support of a pillow under the knees.

Rubber sheets should be placed under the lower sheet if there is danger of the mattress being soiled. There should be a sufficiency of garments to allow for frequent changes and a warm, light jacket to cover the shoulders and arms should be provided. If the patient is helpless a garment opened right down the back so that it can be taken off with little exertion is of assistance.

Storage of Articles.

Arrangements must next be made for the storage of the articles to be used by the patient. The disposal of excreta, the care of soiled linen, and facilities for the attendants to wash their hands are all important points, as well as a thermometer and a watch with a second hand to take the patient's temperature and pulse, and a cupboard where medicine can be kept locked, out of sight and out of reach of children.

Every home should have a first-aid outfit. By a first-aid outfit is meant a

box containing tincture of iodine, disinfectant, boracic powder, and cotton wool, bandages, a packet of Epsom salts and a bottle of castor oil, bicarbonate of soda, and either boracic lint or clean linen. One could enlarge on these supplies, but the whole point is to have something always on hand which can be used safely in any emergency.

Diet.

Watch the patient's appetite. In some cases it is either a feast or a famine. Either the patient is being fed too often with large quantities, or, because of the theory "little and often," it was thought that a large amount of nourishment was taken while really the patient was not receiving enough food. In the majority of instances, unless otherwise ordered, three light meals according to the diet ordered, with perhaps fruit in the morning and afternoon tea, are sufficient.

Daintily cooked and served meals, with a sufficient variety to add to their spice, play a big part. We all know how the sight of an attractive meal "makes the mouth water." An important aspect of feeding the sick is giving plenty of water.

Medicine.

Medicine should always be given when ordered, every three or four hours as the case may be. The bottle should be well shaken, the directions carefully read, and the exact amount poured into a spoon or measuring glass, pouring away from the label side to avoid soiling the instructions.

With regard to aperients, salts should be dissolved with boiling water and allowed to cool, preferably given in the early morning. A dose should be followed either by a drink of cold water or a cup of tea. Cascara is best given in small quantities—15 to 30 drops in a little water immediately before meals three times a day, then gradually decreased to 10 or even 5 drops. This is one of the best aperients.

Every woman at the head of a household should know how to take a temperature and pulse, and how to sponge some one in bed.

The Temperature.

A clinical thermometer is always a useful article to have in the first-aid box. By holding it up to the light between the thumb and the index finger and carefully rolling it backwards and forwards one can easily see the figures and the lines marked. Figures can be plainly seen against certain long lines, and between each long line four similar lines are marked. Each of these little lines count 2.

Thus, if the mercury can be seen at the third small line past the big line marked 99 the temperature is 99·6. The normal temperature is 98·4. A temperature above 99 to 101 is called a slight fever; from 101 to 103 moderate fever; from 103 to 105 high fever; and from 105 to 106 a very high fever.

Occasionally one finds a woman with a nervous temperament who is constantly consulting the thermometer. In that case it is better to put it not only out of sight but out of reach, and it is better even with the normally sick person not to worry him by letting him know his temperature. Only in the case of illness or suspected illness should the thermometer be used. The temperature should not be taken after a hot drink has been given. Young children should never be left with a thermometer.

When a child or an adult is wandering mentally the thermometer should be placed under the arm or on the groin, care being taken that it lies between two dry skin surfaces which are touching. Leave it in position a minute; then take it out, read where the line of mercury has risen, and mark it down on a piece of paper. Then clean and disinfect the thermometer before replacing it in the case. Should the patient run a temperature only liquid food should be given. The bowels should be kept open, and medical advice should be obtained.

The Pulse.

It is a good plan for people to learn to count the pulse. It indicates the condition of the heart, which, of course, is the main engine of the body. The pulse is usually counted at the wrist.

To take the pulse, place two fingers—not the thumb—over the wrist just below the patient's thumb and in front of the prominent wrist-bone. The patient should be in the recumbent position. Place a watch with a minute hand beside you. Wait until you can distinctly feel the pulsation of the blood under your own fingers, and then count each beat, keeping your eye on the watch until the minute-hand has timed half a minute. Multiply this by two and you have the rate of pulse per minute.

A normal pulse is 72, but it is considered normal from 70 to 90. In children the pulse is usually more rapid, and in elderly people it becomes slower. A very rapid pulse indicates some feverish condition, and should be reported to a medical man.

Respiration.

The breathing should also be watched. People in normal health usually take 18 to 20 breaths per minute. In times of sickness breathing becomes distressed and rapid, and it is often necessary to prop up a patient to relieve the strain and assist the lungs in their work.

Sponging.

Any one confined to bed needs to be sponged all over daily and the face, hands, and back attended to at least twice a day. The back is the most important item. Bedsores form very quickly on any one who is not kept thoroughly clean and dry, and is in a bed not free from crumbs. The back itself should be washed with warm, soapy water, dried thoroughly, and then rubbed with methylated spirit and dusted with a little talc powder. The gentle well-rubbing of the part with the hand to stimulate the circulation is most important.

When sponging, always get some one to help you lift or turn a heavy patient. It is harder on the patient for one to attempt to handle alone, and one is also apt to strain oneself.

In sponging a patient it is essential to have everything ready—plenty of dry towels and hot water. Take off the bedclothes and see that the patient is left warm and covered with a blanket, having the oldest next to the patient. Sponge the face and neck first, then the body, being as quick and deft as possible, next one arm, and then the other, and finally roll the patient on to the other side facing you and sponge the back, taking the opportunity, if necessary, to slip in a fresh under-sheet, rolled lengthwise so that the roll comes next to the patient with the other side of the sheet in its normal place.

Going to the other side of the bed, turn the patient over and pull the sheet through. During all this operation the patient must be covered, exposing only the part being attended to. The next act is to make the bed finally, and to see that the teeth and mouth are clean and the hair brushed and nicely arranged.

Hot-water Bottles.

A person in bed must be kept warm. A hot-water bottle must be well protected and never in direct contact with the patient. Many burns have been caused through hot-water bags being placed too near the patients. These burns are very painful and often long in healing. Always see that a blanket is between the hot-water bottle and the patient. Particularly should this be attended to with children and elderly people.

Visitors.

The majority of people like to see some one from the outside world. However, like a fresh breeze, the patient can have too much of it. Too many unsuitable visitors may cause a raised temperature and excitement, which may drive sleep far away. The effect of visitors on the patient should be noted and the doctor informed.

Nursing is hard work and physically tiring, and sufficient rest should be taken, as it is mentally a strain to keep amiable when tired out. Therefore, those doing home nursing should take adequate rest. As a final injunction, it is absolutely essential to see that everything in the sick room is clean.

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Danger of Poison Ivy.

IN an article on "Risks to Gardeners and Market Gardeners" in the May, 1938, issue of the *Journal* the "sumac" (*Rhus toxicodendron*), commonly known as "poison ivy," was included among those plants which require careful handling because of its poisonous nature. However, it might be stressed that careful handling is not sufficient warning against this strange example of the handiwork of Nature. The slightest contact of the bare skin is sufficient to cause some persons acute discomfort or even serious illness for some time. HANDS OFF is the only safe policy.

Stelwagon and Gaskill in their treatise on skin-diseases comment as follows on ivy poisoning:—

"There are some persons who are entirely immune after exposure to this plant, some but slightly susceptible, and others quite vulnerable, while not a few can scarcely go near the plants without an attack. In some instances a gradual immunity seems to be established, more especially as the patient grows older, but this is rather the exception than the rule.

"Presence of Irritation.

"The irritation may be almost immediate, but it generally follows some hours or a day or so after exposure. The arms, forearms, sometimes the face, and even other parts of the body may be affected. It presents either as an erythematous rash, with more or less swelling, or may have a pronounced erysipelatous aspect; sometimes the affected regions are studded over with vesicles, or, in some cases, both vesicles and bullæ. In others again, the blebs may be confluent, and the integument in places more or less denuded and presenting a weeping red surface. Occasionally, there is also pus-formation.

"The first parts usually attacked are, for obvious reasons, the hands or face, to which it may remain limited, or other regions may later become involved, either as the effect of the same exposure or as a result of the irritant being conveyed by the hands. There seems to be well-founded reason to believe that the smoke from the burning plants may produce the eruption, and in this way can be traced cases where the patients are positive they have not encountered any of the leaves or twigs. If the poison be in a resin it can be conveyed in this way a considerable distance."

Branches of the poison-ivy (Rhus toxicodendron) vine showing the leaves, fruit, and aerial rootlets. Note the length of the stem of the middle leaf in each cluster.

Treatment.

A United States Department of Agriculture bulletin recommends that the victim of the poison ivy and a number of other such plants should obtain a 5-per-cent. solution of potassium permanganate and swab it on the poisoned places with a piece of absorbent cotton or soft cloth. The permanganate tends to destroy the poison, but does no harm to the skin beyond making a brown stain. It might be pointed out that there is a natural tendency of the disease to spontaneous and, in some instances, rapid disappearance. However, the advice of a physician should be obtained, as some cases of an acute type need skilled treatment. In some cases it is intractable.

A solution consisting of 5 per cent. ferric chloride in a fifty-fifty mixture of water and glycerine, washed on all exposed parts of the skin and allowed to dry there before going where the dangerous weed grows, has been recommended by the same Department to prevent poisoning from the plant. The best preventive measure is to treat this plant as a noxious weed by having it destroyed.

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The Farm Home and Kitchen.

Contributed by Department of Home Science, University of Otago.

The Balanced Diet.

THE proof of the value of our diet is whether we thrive on what we eat. If we can testify that our food agrees with us and that we are healthy, of average weight, full of vigour, and able to resist disease, then we need not worry about what we are eating, because it is obvious that our diet is adequate and suitable.

But if our health proves to be unsatisfactory when measured by these standards we owe it to ourselves to study our living habits, and especially to see whether we are following the principal rules which govern the selection of food. If we thus criticize our foods as regards their digestibility and their food value and make the necessary corrections we have eliminated at least one cause of ill-health.

Digestibility of Foods.

The digestibility of foods must always be borne in mind when planning a diet. The more finely the food is broken up the more rapidly can the digestive juice penetrate it, and the less likelihood there is of difficult digestion in the stomach and small intestine. Rapid digestion in the small intestine was described in a previous article as being most desirable in forestalling the action of bacteria which would cause the fermentation of carbohydrates or the putrifaction of proteins.

It was therefore suggested that dry, crisp food, or any which must be chewed well, should form a part of each meal, and that pastry and sticky foods should, as far as possible, be avoided. Further, when preparing food for those with no teeth the cook should aim at dishes in which food is not served in lumps, but is minced, chopped, grated, or sieved.

It was also pointed out that food should be attractive in appearance and flavour, and should be given to people when they are not emotionally upset, in order to ensure such a good flow of gastric juice that there will be good stomach digestion. It was shown that a mixture of proteins and starches is an aid to stomach digestion, but that combinations of fat and protein or fat and starch slow up digestion in the stomach.

Irritating Foods.

The irritating action of strongly concentrated foods, such as cheese, nuts, sugars, strongly acid fruit, &c., was pointed out, and it was recommended that these should be diluted by being mixed with some mild-flavoured food, such as breadcrumbs, macaroni, or white sauce, in order to make them less irritating to the lining of the stomach. Sugars and fruit acids should be taken only in diluted form in combination with water or other foods.

The importance of a certain amount of roughage or fibre in the diet was also pointed out, as it was shown that this is needed to encourage peristalsis, or the movement of the food or waste material along the intestines.

These are some of the main facts to be remembered when planning meals to give the most easy and most complete digestion and they will be found in any text-book on nutrition written by eminent psychologists and nutritionists.

Nourishing Foods.

Next comes the question of what to eat in order to be well nourished. Many people would be glad to follow authoritative advice if they knew where to secure it and if it were put before them in a sufficiently persuasive manner. There is no more authoritative publication than the League of Nations bulletin on the "Physiological Bases of Nutrition."

One of the most interesting things about this bulletin is that it definitely classifies the food we eat into two sections—the protective foods, and the supplementary energy-giving foods. This is an extremely important differentiation, and one which every one should understand before planning meals or selecting dishes to make a meal.

If we are unaware that these two classes of food have different values in the nourishment of the body it is very easy for us to plan meals that are low in protective foods and high in the energy-bearing of fuel foods, because it is the latter that are the rich, tasty, filling foods.

Average New Zealand Diet.

Studies of New Zealand diets show that the ordinary New-Zealander, unless she is experimenting with some of the patent diets now in vogue, or unless she happens to be reducing, has an abundance of fuel foods in the diet. The meal-planning problem in most cases lies in increasing the quantity of protective foods. When these are consumed in the quantities necessary to ensure really 100 per cent. nourishment they go a long way towards satisfying the appetite, and consequently there is less desire to fill up with fuel foods.

That is really all that the New Zealand housewife needs to watch for in order to give her family a balanced diet—give them more protective foods, and automatically reduce the fuel foods. There is a simple definition of the protective foods and one or two words of wisdom about them in the League of Nations bulletin, which should be passed on.

Deficiencies in Diet.

The bulletin says: "The Commission recognizes the fact that the deficiencies of modern diets are usually in the protective foods (foods rich in minerals and

vitamins) rather than in more strictly energy-bearing foods (rich in calories).

"The term 'protective food' denotes a foodstuff which is especially rich in those nutrient principles, 'good' protein, vitamins, or minerals, in which the principal foods of any geographic area are deficient.

"Thus, in the United States of America and in New Zealand, where the chief constituents of the daily diet are usually white bread and other foods made from white flour, sugar and muscle meat, milk, and the leafy vegetables form the most important protective foods.

Protective Foods.

"Among the protective foods are, first and most important, milk and milk products (including butter), eggs and glandular tissues and organs (heart and liver, &c.), then green-leaf vegetables, fruit, fat, fish, and meat (muscle). Among the energy-bearing foods of little or no protective power are sugar, milled cereals, and certain fats.

"Of energy-giving foods, unmilled cereals are not rich in protective nutrients, and the more they are refined the less is their protective power. Many fats, especially when refined, possess little or no protective constituents. Refined sugar is of value only as a source of energy; it is entirely devoid of minerals and vitamins. The increasing habit in certain countries of large sugar consumption tends to lessen the amount of protective foods in the diet, and is to be regarded with concern. In cases where energy values are equal, protective foods should always be preferred."

Hence, it is seen that milk and all its products, eggs, green vegetables, liver, heart, &c., are the chief foods for supplying the minerals and vitamins needed to maintain a healthy body and to give protection from disease, while white sugar and white flour are among those which lack protective power.

Meal-planning Guide.

Many housewives have realized that their family should be getting more of this or that type of food, or that they are living on a very monotonous diet chiefly made up of mutton and white flour and sugar foods, but they have felt unable to do anything about it as the necessary foods appeared to be beyond their reach. It was to help such housewives that since 1920 we have published a meal-planning guide which we have distributed at the nominal cost of 2d. per copy. In this guide we have classified the foods according to their value as sources of the substances needed by the body, and by its use the housewife can see at a glance which of the cheap and available foods are valuable for balancing the diet.

One column gives a list of the carbohydrate foods rich in energy value, another the fats also valuable for energy. Then comes a column showing the valuable protein foods, such as milk, eggs, fish, meat, &c., used for the growth and repair of tissues. Then there is a column of the foods rich in lime, with milk heading the list again.

Then come the iron-rich foods—liver, egg-yolk, &c. This is followed by the iodine-rich foods, because New Zealand has a special goitre problem which requires the housewife to watch that the diet contains iodine-giving foods, such as seaweed foods, salt water, fish, &c. There is a column of foods rich in fibre (needed, as was explained, to stimulate the intestines to healthy activity), and the sources of each of the four main vitamin groups are given.

Hence, if, for instance, the housewife cannot afford citrous fruit and has no home-grown fresh fruit to supply vitamin C, she looks down the column to find what she can use instead, and finds that raw cabbage and carrots, or else potatoes, will give vitamin C. She makes a carrot and cabbage salad, or else she boils potatoes in their jackets, with the cold meat for tea, instead of making scones or having bread, which do not figure on the vitamin C list.

By using her lists she can see which foods bring a double load of food value—for instance, how milk brings protein, lime, and vitamins A and D, whereas milkless tea does not figure on any food list at all; how whole-grain cereals are valuable for iron, roughage, and vitamin B, as well as for fuel, whereas refined cereals are valuable for fuel only.

General Rules for Meal-planning.

On the bottom of our meal-planning chart, to remind the housewife of the general rules for meal planning, ten suggestions are made. Here they are:—

(1) Drink sufficient water—six glasses daily.
(2) Fresh, uncooked vegetables or fruit twice a day.
(3) Two vegetables in addition to potatoes daily.
(4) One and a half pints of milk for each child; 1 pint for each adult a day.
(5) Use plenty of eggs.
(6) Make use of the cooking water of vegetables and fruits in soups, gravies, desserts, &c.
(7) Use some crisp salad foods daily.
(8) Avoid an excess of rich food—*e.g.*, pork and pastry at one meal.
(9) Provide a variety from day to day.
(10) Use home-grown seasonable food, if possible.

By following these directions a balanced diet is within the reach of every one.

❖ ❖ ❖

For Sale.

Ten-week's-old pullets—White Leghorn and Langshans.

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The Poultry Overseer,
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Recommended Recipes.

Raisin Tart with Date Meringue.

Water, 1 cup.
Raisins, ½ lb.
Flour, 1¼ tablespoons.
Egg, 1.
Castor sugar, ½ cup.
Golden syrup, ¼ cup.
Butter, 1 tablespoon.
Spice, ½ teaspoon.
Walnuts, ¼ cup.
Dates, ¼ cup.
Short pastry, ¼ lb.

Method.—Cook raisins in water and syrup. Cover and simmer for one hour. Remove from fire. Add flour creamed with butter and spice. Cook until thick. Boil five minutes. Add egg-yolk. Pour into cooked pie-shell. Beat egg-white, stir in nuts, sugar, and chopped dates. Brown in slow oven.

Sweetbreads and Bacon.

Sweetbread, 1.
Flour, ¼ cup.
Egg, 1.
Breadcrumbs.
Bacon.

Method.—Parboil the sweetbread—cut into small pieces—dip into flour, egg, and breadcrumbs, and arrange alternately with pieces of bacon on small skewers, having four pieces of sweetbread and three pieces of bacon on each skewer. Fry in deep fat and drain. Arrange in a circle round a mould of green peas.

Tripe in Batter.

Tripe, 1 lb.
Flour, 1 cup.
Milk, ½ cup.
Salt, ½ teaspoon.
Pepper, ⅛ teaspoon.
Egg, 1.
Baking-powder, 1½ teaspoons.

Method.—Cut honeycomb tripe in pieces for serving. Wash, cover with boiling water, and simmer twenty minutes. Drain and again cover with water. Heat to boiling-point, drain tripe as dry as possible, sprinkle with salt and pepper, dip in batter, fry in deep fat, and drain on paper. Serve with slices of lemon and chili sauce.

Batter.—Mix and sift flour, salt, pepper, and baking-powder; add ⅔ cup milk and egg well beaten.

Jellied Fish.

Cold flaked fish, 1 cup.
Hard-boiled eggs, 2.
Gelatine, 1 tablespoon.
Boiling water, 1 breakfastcup.
Vinegar or lemon juice, 1 tablespoon.

Method.—Put alternate layers of fish and sliced egg into a wet mould. Soak gelatine in the vinegar or lemon-juice, and pour on the boiling water. Stir until clear, add salt, and when cool pour carefully over the fish and egg. Allow to set. Turn on to a dish, surround with chopped lettuce and serve with mayonnaise dressing.

Potato and Fish Salad.

Boiled or steamed fish.
Boiled potatoes.
Dressing.
Lemon, 1.
Watercress.

Method.—While the potatoes are still hot cut into dice and mix into half the dressing. Put into a salad-bowl. Remove skin and bone from the cooked fish and divide into flakes. Pile on top of the potatoes and cover with the remainder of the dressing. Cut the lemon in half across and then each half into quarters. Decorate the edge of the salad with alternate sprigs of watercress and quarters of lemon.

Fish Chowder.

White fish, 1 lb.
Cold water, 3 cups.
Salt pork or bacon, 2 slices.
Onion, 1.
Carrots (diced), 1½ cups.
Milk, 2 cups.
Salt, 2 teaspoons.
Pepper, ⅛ teaspoon.
Crackers, 5 to 6.
Potatoes (diced), 1 lb.

Method.—Wipe fish and cut in pieces off the bones. Cook the bones in cold water twenty minutes. Strain off the liquid into another pan. Cut pork or bacon into small pieces and fry with the sliced onion. Then add the hot liquor and vegetables and cook twenty minutes. Add the fish and cook fifteen minutes longer at simmering temperature (185° F.). Add the milk and crackers broken in small pieces and simmer five minutes. Serve hot.

Lyonnaise Tripe.

Tripe, ½ lb.
Onion, 1.
Butter, 2 tablespoons.
Salt, ⅛ teaspoon.
Pepper, ½ teaspoon.
Parsley.

Method.—Parboil tripe, then place in cool oven to draw off some of the water. Cook the finely-chopped onion in the butter until slightly browned. Add tripe drained and cook five minutes. Sprinkle with seasonings and chopped parsley. Serve with sauce or gravy.

Stuffed Sole.

Sole, 1 large.
Dried breadcrumbs.
Onion.
Tomatoes.
Parsley.
Egg for brushing over.
Stuffing—
  Grated cheese, 1 oz.
  Butter, 1 oz.
  Hard cooked egg, 1.
  Anchovy, 1 teaspoon.
  Salt.
  Pepper.

Method.—Remove the skin, eyes, and side fins. See that fish has been cleaned thoroughly. Make an incision down the backbone on upper surface and with the knife flattened against the skeleton, make two pockets—one on either side of backbone. Rub salt inside pockets, and fill with stuffing. Brush over the fish with egg (one egg, two tablespoons water) and sift fine crumbs over surface. Over incision place slices of tomato and onion alternately. Place on greased pan and bake at 350° F. until tender, about twenty minutes. Serve on ashet garnished with lemon.

Stuffed Loin Chops.

Loin chops.
Kidneys.
Bacon.

Method.—Choose large chops. Wipe with a damp cloth, slit them and in each pocket insert a tablespoon of kidney finely chopped and seasoned. Wrap slices of bacon around the outer edge of the chops, fasten with toothpicks, and broil or pan broil. Season and serve with brussels sprouts.

Founders of Modern Agriculture, No. 11.

J. W. Woodcock, Crop Experimentalist, Fields Division.

Gregor Johann Mendel.

GREGOR MENDEL (1822–1884), whose experiments in plant hybridization laid the foundation for most of the modern work on heredity, may be said to be the founder of the science of genetics.

He was a native of Austrian Silesia, and in his earlier years studied for the priesthood, later becoming an abbot in the Augustinean Monastery at Brunn. Mendel studied natural science and physics in Vienna, and while there he became interested in the problems underlying the transmission of hereditary characters.

Research in a Monastery Garden.

When Mendel entered the monastery in 1853 he began a series of experiments on the crossing of different varieties of garden peas, which resulted in one of the most important of all biological discoveries. In the cloister gardens—probably ideal conditions for research work—he made repeated crosses between plants which differed in various characteristics, and observed how these characters were transmitted to the offspring.

Accurate pedigree records were kept, and in cases where contrasting types appeared in the progeny of the same parents he counted them and obtained statistical records of his results.

Mendel's Laws of Inheritance.

After ten years of patient work and careful observation Mendel's conclusions were announced in a paper entitled "Experiments in Plant Hybridization." He showed that inheritance was not a casual process but was subject to definite laws, and that if the ancestry and constitution of parents were known it was possible to predict with some accuracy how the characters would appear in the offspring.

Gregor Johann Mendel.

The most important feature of Mendel's work lies in the explanation which he offered regarding the experimental results. His conception of distinct unit characters which are capable of being inherited independently of each other has given precision to our views of the nature of heredity and the constitution of pure breeds and hybrids.

Science of Genetics.

Mendel's researches laid down the foundation of the science of genetics, which has contributed very largely to the progress of agriculture during recent years. His work, however, attracted little notice at the time, and it was only in 1900, when other workers obtained experimental results agreeing very closely with those of Mendel, that the latter's work emerged from obscurity.

Mendel was the founder of scientific plant-breeding.

Price of Strychnine for Rabbit-poisoning.

The price of strychnine for the purposes of rabbit-poisoning has now been reduced to 3s. 3d. per ounce. Case lots containing 100 oz. are obtainable at 2s. 6d. per ounce, f.o.r. or f.o.b.

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